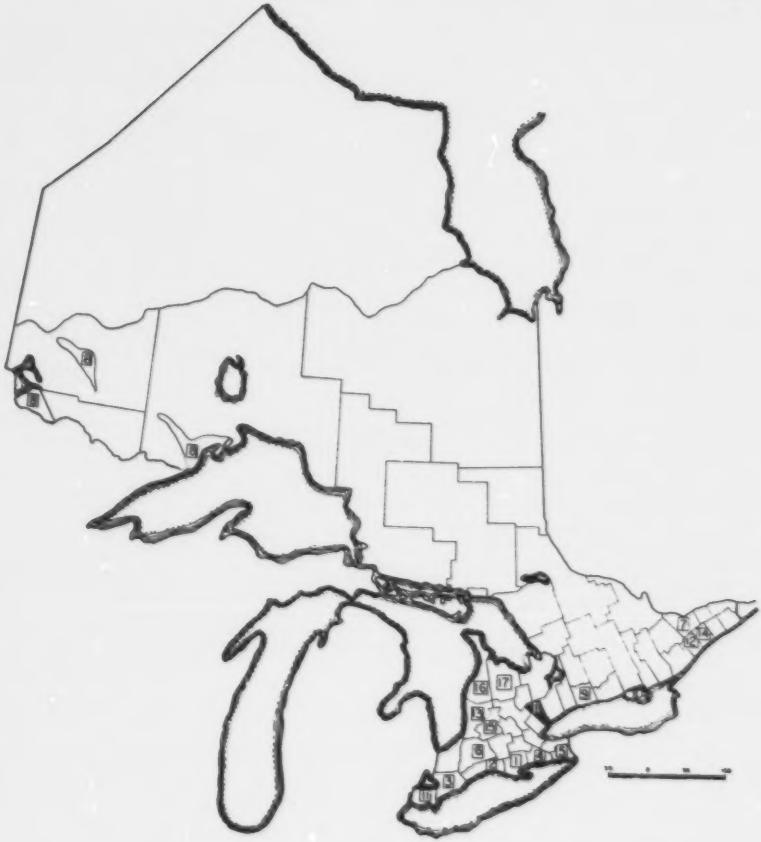
Soil Survey of Peel County



REPORT NO. 18 OF THE ONTARIO SOIL SURVEY

Ontario
Ministry of Agriculture and Food
David Ramsay, Minister

Agriculture Canada
Research Branch
Direction générale de la recherche

Soil Survey of Peel County

by

D. W. HOFFMAN

Experimental Farms Service

and

N. R. RICHARDS

Ontario Agricultural College

GUELPH, ONTARIO

November 1953

(Reprinted February 1990)

REPORT NO. 18 OF THE ONTARIO SOIL SURVEY

91-00588/

For other Counties and
Districts Survey Information,
Contact the
Consumer Information Centre,
Ontario Ministry of Agriculture and Food,
Main Floor,
801 Bay St.,
Toronto, Ontario
M7A 2B2

PREFACE

The survey of Peel County was completed during the summer of 1950.

Other counties and districts surveyed and maps published are as follows:

Norfolk	*Map only*
Elgin	*Map only*
Kent	*Map only*
Haldimand	*Map only*
Welland	*Map only*
Middlesex	*Map only*
Carleton	*Map and Report*
Parts of Northwestern Ontario	*Map and Report*
Durham	*Map and Report*
Prince Edward	*Map and Report*
Essex	*Map and Report*
Grenville	*Map and Report*
Huron	*Map and Report*
Dundas	*Map and Report*
Perth	*Map and Report*

ACKNOWLEDGMENTS

The Canada Department of Mines and Technical Surveys, Surveys and Mapping Branch, supplied the base maps. The final copy of the Soil Map for lithographing was prepared by the Cartographic Section of the Division of Field Husbandry, Soils and Agricultural Engineering, Central Experimental Farm, Ottawa.

Helpful suggestions pertaining to classification and correlation, and assistance in critically reviewing the manuscript came from Dr. P. C. Stobbe, Canada Department of Agriculture, and others.

TABLE OF CONTENTS

PAGE

INTRODUCTION 9

PART I. GENERAL DESCRIPTION OF AREA 9

Location and Area 9

County Seat and Principal Towns 10

Population and Racial Origin 10

Transportation and Markets 12

PART II. FACTORS AFFECTING THE FORMATION OF PEEL COUNTY SOILS 13

Soil Parent Materials 13

Natural Forest Vegetation 16

Climate 19

Relief 22

Drainage 22

Age 23

Erosion 24

PART III. THE CLASSIFICATION AND DESCRIPTION OF PEEL COUNTY SOILS 25

System of Classification 27

Differentiation of Peel County Soils According to Soil Materials and Drainage 27

Dumfries loam 29

Dumfries sandy loam 31

Lily loam 31

Harriston loam 32

Listowel loam 33

Parkhill loam 34

Woburn loam 35

Milliken loam 36

Lyons loam 37

King clay loam 38

Monaghan clay loam 39

TABLE OF CONTENTS (*Cont'd*)

PART III. THE CLASSIFICATION AND DESCRIPTION OF PEEL COUNTY SOILS (*Cont'd*) PAGE

Oneida clay loam ... 40
Chinguacousy clay loam ... 42
Jeddo Clay Loam ... 44
Pontypool sandy loam ... 44
Brighton sandy loam ... 46
Fox sandy loam ... 47
Fox sand ... 48
Brady sandy loam ... 49
Caledon loam ... 49
Gilford loam ... 51
Bookton sandy loam ... 52
Berrien sandy loam ... 53
Cashel clay ... 54
Peel clay ... 55
Malton clay ... 55
Brockport clay loam ... 57
Cooksville clay loam ... 58
Missisauga clay loam ... 59
Lockport clay ... 60
Trafalgar clay ... 61
Farmington loam ... 62
Muck ... 62
Bottom land ... 63

PART IV. AGRICULTURE AND LAND USE ... 64
Early Settlement and Agricultural Development ... 64
Present Agriculture ... 64
The Use and Management of Peel County Soils ... 67
Problem Areas ... 74
Adaptability Rating for Peel County Soils ... 78
Good Crop Land ... 80
Good to Fair Crop Land ... 80
Fair Crop Land ... 81
Fair to Poor Crop Land ... 81
Poor Crop Land ... 82
Submarginal Crop Land ... 82

PART V. ANALYTICAL DATA ... 83

MAP — Soil Map of Peel County ... in pocket back of report.

TABLES

No.		Page
1.	Trend of Population (Total)	10
2.	Population by Principal Origins, 1941 Census	10
3.	Analysis of Underlying Shale Formations in Peel County	13
4.	Analysis of Underlying Limestone Formations in Peel County	14
5.	Temperature at Alton and Other Selected Points	20
6.	Precipitation at Alton and Other Selected Points	21
7.	Present Land Use	65
8.	Present Use of Improved Land	65
9.	Present Use of Unimproved Land	65
10.	Acreage of Field Crops in Peel County	66
11.	Acreage of Tree Fruits and Small Fruits in Peel County	66
12.	Types of Farm Occurring in Peel County	67
13.	Crop Adaptability Ratings for Good Crop Land	80
14.	Crop Adaptability Ratings for Good to Fair Crop Land	80
15.	Crop Adaptability Ratings for Fair Crop Land	81
16.	Crop Adaptability Ratings for Fair to Poor Crop Land	81
17.	Crop Adaptability Ratings for Poor Crop Land	82
18.	Crop Adaptability Ratings for Submarginal Crop Land	82
19.	Physical Composition, Reaction, Base Exchange Capacity and Per cent Saturation of Surface Samples from Peel County	84

ILLUSTRATIONS

Figure		Page
1.	Outline Map of Ontario showing Location of Peel County and Other Areas for which Soil Maps have been published	8
2.	Outline Map of Peel County showing Towns, Townships, Railways, etc.	11
3.	Outline Map of Peel County showing distribution of Soil Materials	17
4.	Outline Map of Peel County showing distribution of Tree Associations	18
5.	Climatic Regions of Peel County	19
6.	Outline Map of Peel County showing Natural Drainage Courses	23
7.	Outline Map of Peel County showing distribution of Textural Classes	68
8.	Outline Map of Peel County showing distribution of Soil Problem Areas	75
9.	Outline Map of Peel County showing distribution of Erosion Classes	76
10.	Outline Map of Peel County showing distribution of Drainage Classes	77

FIG. 1—Outline map of Ontario showing location of Peel County and other areas for which Soil Maps have been published.

Soil Survey Peel County, Ontario

by

D. W. HOFFMAN *and* N. R. RICHARDS

INTRODUCTION

A detailed reconnaissance survey of Peel County was undertaken in order to study the nature and extent of the different soils occurring within the area. The County was originally surveyed in 1941. Subsequent modifications in soil classification made a re-survey necessary which was completed in 1950. The project consists of two parts, the preparation of a Soil Map and the Soil Survey Report.

The Soil Map is an important feature of the report, since it indicates the distribution and area of the different soils found in the County. It also shows the most important physical features of the area such as roads, railways, rivers, buildings, towns, etc. By using the lot numbers and the concession lines the property owner can plot his location on the map and determine the soil types occurring in his locality. The map was prepared on the scale of one inch to the mile. Consequently, the scale of mapping would not permit the delineation of areas twenty-five acres and less in size.

The Soil Report presents the information obtained by the survey. It contains information as to the formation, character, capabilities and limitations of the soils and gives a brief general description of the area. Every soil type is described in detail and the capability and fertility of each soil type is discussed.

The soils in the surveyed area differ significantly and this has an important bearing on the kind of crops grown, the yields obtained, and the soil management practices required. Field observations and laboratory studies have provided information which permits tentative conclusions regarding adaptability and productivity of the soils. However, much accurate information regarding management and fertility requirements is still needed for the best utilization of many soils.

To assist in the interpretation of the Soil Survey some of the problems of soil use and management are discussed and outline maps showing the distribution of drainage classes, eroded areas, and problem areas are presented.

PART I

GENERAL DESCRIPTION OF THE AREA

Location and Area

Peel County is located on the northern shore of Lake Ontario in Central Ontario. It extends north to the Counties of Dufferin and Simcoe and is bordered on the west by Wellington and Halton Counties. York County adjoins it on the east. Toronto, the provincial capital, is situated about six miles beyond its eastern boundary.

The total land area of the County is 300,160 acres (469 square miles) of which, according to the Eighth Census of Canada, 1941, 274,225 acres or about 91 per cent is occupied farm land. The remaining 9 per cent is taken up by road allowances, bogs, marshes, etc.

County Seat and Principal Towns

The County seat is Brampton (6,000)* situated in the central part of the County. The town is important agriculturally because of its location in the centre of the farming district. The office of the Representative of the Provincial Department of Agriculture is located here and the town is well known for its horticultural achievements. Brampton is the largest town in the County.

Port Credit (2,000) overlooking Lake Ontario, serves as a marketing centre for many agricultural products, and Streetsville (700), located in the south west part of the County, is the home of a well-known grist mill. Bolton (600) is located on the Humber River in Albion Township. In addition to these incorporated urban towns and villages there are several small villages and community centres such as Cooksville and Terra Cotta where large brick-making plants are located, Malton where a large part of the area is devoted to airports and aircraft factories, and other centres such as Alton, Caledon, Inglewood, Belfountain, Erindale, and Dixie.

Population and Racial Origin

According to the 1941 Census the total population of the County is 31,539. Approximately 70 per cent (22,073) of the people were rural dwellers in 1941 while 30 per cent (9,466) were classified as urban population.

From 1871 to 1901 there was a decrease in population in the County. However there has been a marked increase in population since 1901 which is shown in Table 1.

TABLE 1

TREND OF POPULATION (TOTAL)

Year	Population	Year	Population
1871	26,011	1911	22,102
1881	26,175	1921	23,896
1891	24,871	1931	28,156
1901	21,475	1941	31,539

A large proportion of the population of Peel County is of British origin. The following table shows the population by principal origins:

TABLE 2

POPULATION BY PRINCIPAL ORIGINS, 1941 CENSUS

Canadians of British origin —		
English	16,597	52.6
Irish	7,540	23.9
Scottish	4,403	14.0
Canadians of other origin	2,999	9.5
Total population	31,539	100%

*Population figures from 1941 Census of Canada.

FIG. 2—Outline map of Peel County showing towns, townships, railways, etc.

Transportation and Markets

Peel County is served by a good network of roads and railways. The southern section is traversed by Queen's Highways 2 and 5 and by the Queen Elizabeth Way all of which afford rapid transit to the city of Toronto. Highway No. 7 traverses the County through Brampton and is a connecting link with marketing centres to the east or west. Highway No. 10 runs in a northerly direction from Port Credit through Brampton to Orangeville and serves the northern part of the County. A good system of Township and County roads makes rapid transportation of agricultural products to market possible.

The main lines of both the Canadian National and Canadian Pacific Railways traverse the southern part of Peel County. The Canadian National main line connects Brampton with Toronto on the east and Guelph on the west. The Canadian Pacific main line connects Hamilton and Toronto and runs through the Peel County town of Streetsville. The northern part of the County is served by many lines. The Toronto-Sudbury line of the Canadian Pacific Railway goes through the town of Bolton serving the northeast corner of Peel County. The Hamilton, Beeton, and Allandale branch of the Canadian National Railway connects the communities of Cheltenham, Inglewood, Caledon East, and Palgrave. The centres of Streetsville, Brampton, Inglewood, Credit Forks, Cataract, and Alton are connected by the Toronto, Orangeville branch of the Canadian Pacific Railway. Adequate road and railway facilities serve all parts of the County and provide good communication with eastern and western marketing centres.

PART II

FACTORS AFFECTING THE FORMATION OF PEEL COUNTY SOILS

Soil is a product resulting from the disintegration and decomposition of mineral parent material and of plant and animal materials. The formation of soil is influenced by various factors which include composition of parent material, climate, topography, organisms, and time. Since soils are products of environmental conditions they will vary where these conditions differ. The action of the soil-forming factors results in a soil endowed with a series of fundamental features consisting of a number of genetically related layers or horizons that may be described by words or drawings. It is difficult to measure the effect of any single factor on the formation and development of a soil. However, the cumulative effect of all environmental factors is reflected in the soil profile.

Soil Parent Materials

Peel County is underlain by the Dundas, Meaford, Queenston, Medina, and Lockport geological formations. The Dundas formation is a greyish blue shale that weathers to a somewhat lighter colour. The Meaford strata consist of grey to bluish shale with interstratified hard layers varying in composition from impure calcareous sandstone and sandy shale to pure crystalline limestone. Brick red sandy and argillaceous shale, which decomposes rapidly on exposure to form a reddish clay soil, makes up the Queenston formation. The Medina formation consists of several members of which the Whirlpool member is prominently located in Albion Township. It is a resistant light grey quartzose sandstone which includes some argillaceous material similar to that of the Queenston formation. There is considerable variation in colour throughout the area occupied by the Lockport formation. However, it is essentially a magnesian limestone or dolomite, light grey to bluish in colour.

TABLE 3

ANALYSIS OF THE UNDERLYING SHALE FORMATIONS IN PEEL COUNTY

	Dundas Formation (1)	Meaford Formation (2)	Queenston Formation (3)
Silica (SiO_2)	57.86	58.12	56.52
Alumina (Al_2O_3)	20.00	15.86	15.21
Iron (Fe_2O_3)	6.83	6.31	5.82
Lime (CaO)	2.92	3.39	6.86
Magnesia (MgO)	3.25	2.92	2.82
Potash (K_2O)	.....	4.50	3.59
Soda (Na_2O)	.....	.65	.56
Loss on Ignition	5.74	7.30	8.79
Total	96.60	99.05	100.17

1. Cooksville Brick Yard, Cooksville, Ontario.
2. Cooksville Brick Yard, Cooksville, Ontario.
3. Brampton Pressed Brick Company, Brampton, Ontario.

TABLE 4

ANALYSIS OF THE UNDERLYING LIMESTONE FORMATIONS IN PEEL COUNTY

	Medina Formation (1)	Lockport Formation (2)
Silica (SiO_2)	12.46	0.72
Ferric Oxide (Fe_2O_3)	2.22	0.50
Alumina (Al_2O_3)	1.10	0.54
Calcium Carbonate ($CaCO_3$)	47.39	55.16
Magnesium Carbonate ($MgCO_3$)	35.72	42.85
Total	98.89	99.77

1. Melville Junction
2. Credit Forks.

A large part of the County is covered by drift deposited by melting ice of the Wisconsin Glaciation. In some areas the deposit of drift over the underlying bedrock is thin, particularly in the southern and northwestern part of the County. The drift deposits appear to contain a fairly large proportion of fragments from the underlying bedrock.

The unsorted material deposited by ice is generally referred to as till and is an accumulation of particles of all possible sizes from clay and silt to sand and gravel with a varying proportion of stones and boulders. There are five types of till in the County.

1. Coarse, open limestone till.
2. Medium textured limestone till.
3. Medium textured shale and limestone till.
4. Fine textured shale and limestone till.
5. Fine textured limestone till.

The coarse, open limestone till occurs in small areas in the northern part of the County, particularly in the district south of Mono Mills. These deposits are characterized by lack of sorting and contain large numbers of stones of varying size, throughout the matrix of sand, silt and clay. The till is predominantly of Lockport origin and effervesces freely with dilute hydrochloric acid.

The medium textured limestone till occurs most commonly in Caledon Township. These deposits exhibit a lack of sorting and contain fewer stones scattered throughout the matrix of sand, silt and clay than are evident in the coarse limestone materials. The till occurs in gently to moderately sloping plains having characteristic drumlinoid features and is calcareous.

Similar to the loamy limestone till materials are the shale and limestone materials occurring in the Kilmanagh district. The main difference between the two types of material is the presence of a larger amount of shale in the shale and limestone materials.

Fine textured shale and limestone till is the dominant soil material found in Peel County. It is predominantly of the Queenston formation although

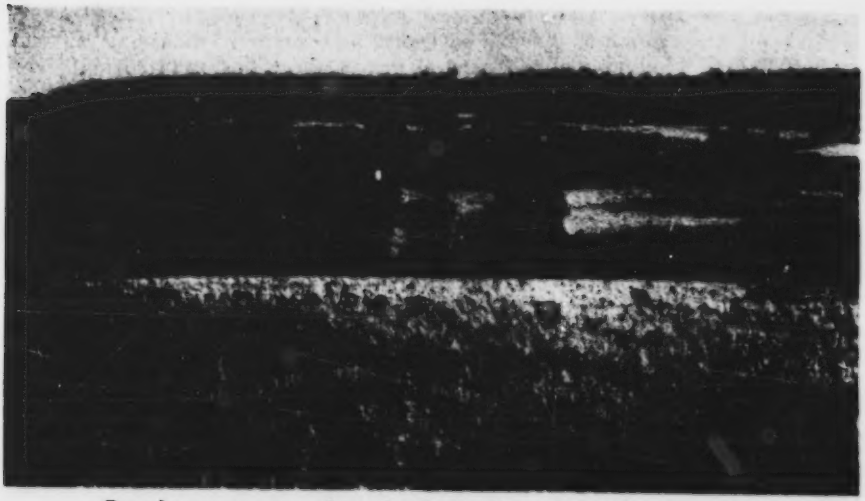
a portion originates from the Dundas and Meaford formations. Large areas occur in Toronto and Chinguacousy Townships. Ranging in topography from very gently to moderately sloping the materials are usually heavy textured with few stones. The lime content is lower than in the materials containing larger amounts of limestone.

Deposits of fine textured limestone till are found in Albion Township in the area north of Bolton. This till has been intermixed with a large proportion of lacustrine materials resulting in a material of somewhat different composition than the underlying bedrock. These materials occur in gently to steeply sloping plains and lack the drumlinoid features of the medium textured tills farther west. The lime content is higher than in the shale and limestone till found farther south.

Poorly sorted glacio-fluvial sands occupy a large area in the northern part of the County. Having smooth, steep slopes they are predominantly sandy but may contain pockets of till and gravel. Areas located in close proximity to the sandy or loamy till materials often have a large number of stones or boulders scattered over the surface. The materials effervesce freely with dilute acid.

A large area of the northwestern part of the County is occupied by the well sorted gravel and smaller areas of well sorted sands occur throughout the County. The well sorted gravel ranges in topography from very gently sloping to moderately sloping whereas the surface of the sands is usually gently sloping. The gravel contains varying amounts of shale and effervesces freely with dilute acid. The sands are stonefree and are usually high in lime, except for a large area near the lakeshore where the unweathered materials contain considerably less calcium carbonate.

Frequently deposits of sand three feet and less are underlain by clay till which exhibits characteristics similar to the clayey materials discussed previously.



Gravel terraces occur along the Credit River. In the background is the Niagara escarpment.

A portion of Toronto, Toronto Gore and Albion Townships was covered by glacial Lake Peel for a period of time. This has resulted in the deposition of shallow lacustrine material over the clay till mentioned above. The topography varies from smooth moderately sloping to smooth very gently sloping and the materials effervesce freely with acid.

Exposed bedrock and shallow soils over bedrock occur mainly in the southern and western part of the County.

Organic deposits occur in small areas, scattered chiefly over the northern part of the County. They are largely the remains of decayed trees, herbs, and mosses. Their chemical composition varies depending on the origin of the materials. The organic materials in Peel County form muck soils.

The distribution of the different soil parent materials of Peel County is indicated in Figure 3.

Natural Forest Vegetation

The type of natural vegetation found in an area is largely dependent on climatic and soil factors. When vegetation becomes established it in turn exerts considerable influence on the development of a soil and therefore is an important factor of soil formation. The extent to which vegetation influences soil development varies with the type of vegetation. The forest litter of deciduous trees decomposes more readily and is richer in plant nutrients than the litter from conifers and it is generally assumed that the latter produces more strongly leached soils than the former.

Since vegetation is one of several inter-related soil forming factors, it is very difficult to measure the exact effect of vegetation on the detailed profile features which are used to make soil type separations. A survey of the vegetation has been made to show, in a general way, what tree association most commonly occurs on some of the more important soils in Peel County.

In some areas much of the tree cover has been removed making it difficult to reconstruct a picture of the natural vegetation. The information given below was gained mainly from the woodlots that occur throughout the County.

According to Halliday* Peel County is mostly situated in the Huron-Ontario section of the Great Lakes-St. Lawrence Region and a narrow section along Lake Ontario occurs in the Niagara Section of the Deciduous Forest Region.

The different species of trees found in the area are not listed. However, certain combinations or associations of trees occur more frequently on some soils than others. The distribution of the associations throughout Peel County is shown in Figure 4. The most commonly occurring associations are:

Oak—Sugar Maple—Pine Association

This association occurs on the well drained soils on shallow and deep clay tills overlying the shale bedrock. Beech and elm are also present.

* Halliday, W.E.D. A Forest Classification for Canada. Bull. 89, Forest Science, Department of Mines and Resources.

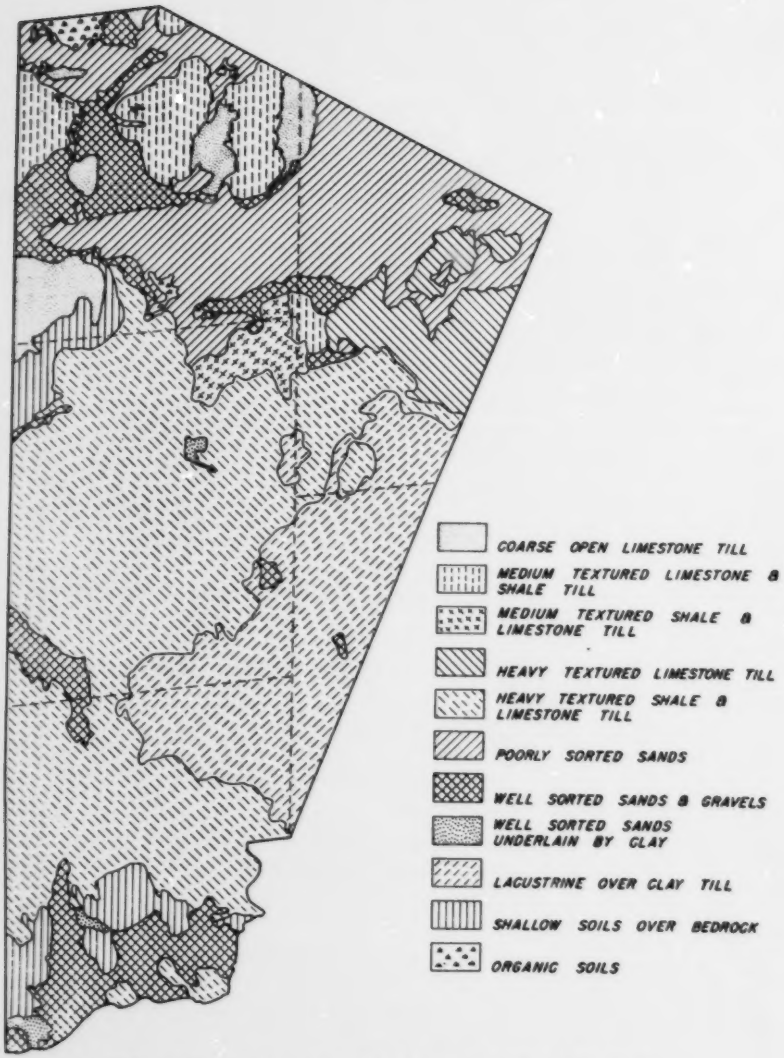

SOIL MATERIALS
COARSE OPEN LIMESTONE TILL
MEDIUM TEXTURED LIMESTONE & SHALE TILL
MEDIUM TEXTURED SHALE & LIMESTONE TILL
HEAVY TEXTURED LIMESTONE TILL
HEAVY TEXTURED SHALE & LIMESTONE TILL
POORLY SORTED SANDS
WELL SORTED SANDS & GRAVELS
WELL SORTED SANDS UNDERLAIN BY CLAY
LACUSTRINE OVER CLAY TILL
SHALLOW SOILS OVER BEDROCK
ORGANIC SOILS

FIG. 3—Outline map of Peel County showing distribution of soil materials.

Sugar Maple—Beech—Spruce Association

The sugar maple, beech, spruce combination appears most frequently on the well drained loam tills, the sands and the gravels. The sands have a somewhat larger proportion of spruce present than the tills or the gravels.

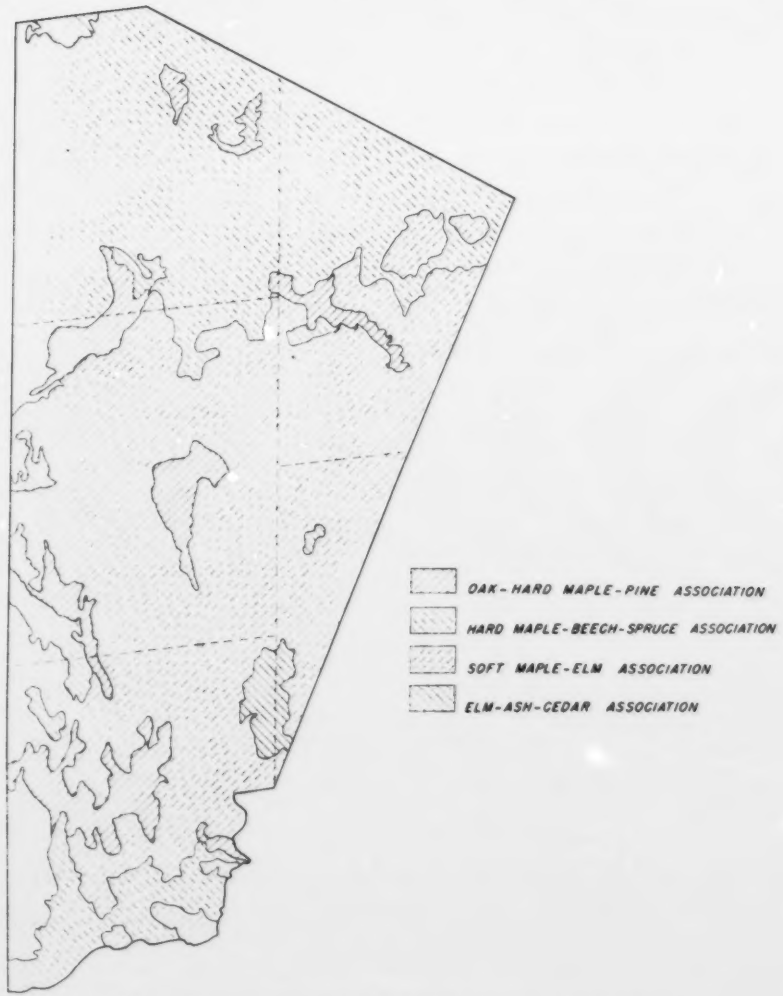


FIG. 4—Outline map of Peel County showing distribution of tree associations.

Soft Maple—Elm Association

This association is dominant on the imperfectly drained soils and also occurs most frequently on the well drained clay tills that are dominantly of limestone origin. Only a small proportion of this association is found in the County at the present time since most of these soils have been cleared. In the wooded areas that remain elm would appear to dominate with soft maple being found in somewhat lesser amounts.

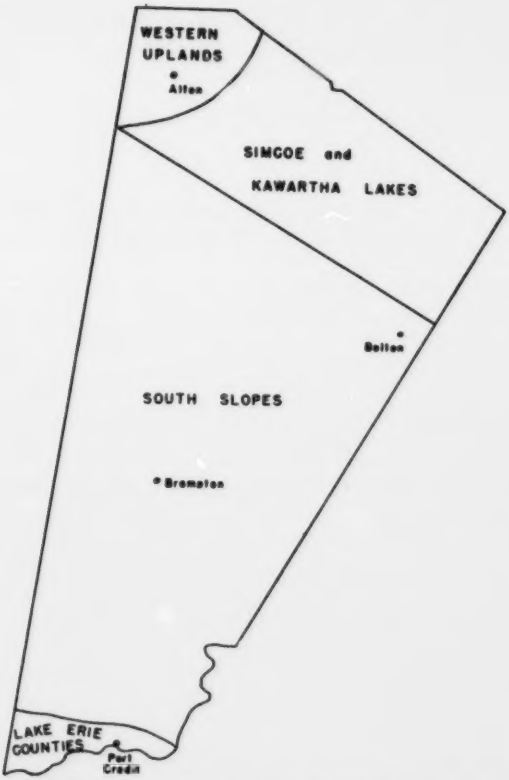


FIG. 5—Climatic regions of Peel County.

Elm—Ash—Cedar Association

Found for the most part on the poorly drained soils of the County, elm and ash are most prominent on the mineral soils. The soils that are organic in nature have a large proportion of cedar present.

Climate

Rainfall and temperature are two climatic factors that have a great influence on soil formation. The amount of water that percolates through the soil material is influenced by rainfall, relative humidity and frost-free period and is an important factor of soil weathering. Temperature is also a factor of soil weathering and influences the speed of chemical reactions.

The climate of this region is generally considered to be of the humid continental type which is characterized by moderate winters, warm summers and sufficient rainfall to allow the growth of most farm crops.

Peel County is located, for the most part, in the South Slopes region as designated by Putnam and Chapman*. Small sections of the County are

* Putnam, D. F. and Chapman, L. J. The Climate of Southern Ontario; Sci. Agr. 18:8 April 1938.

included in the regions known as Western Uplands, Simcoe and the Kawartha Lakes and the Lake Erie Counties. These climatic regions are diagrammatically illustrated in Figure 5.

There is only one meteorological station in the County and it is located at Alton.

Climatic data is presented in tables (5, 6) from Alton and other selected points. The data from Alton represents the Western Uplands region and that from Georgetown represents the South Slopes region. Climatic records from Paris and Lindsay are presented so that the Lake Erie and Simcoe and Kawartha Lake regions are also represented respectively. Records from Huntsville are included to represent the transitional zone between hardwoods and conifers while Kapuskasing represents the northern coniferous region.

TABLE 5

TEMPERATURE AT ALTON AND OTHER SELECTED POINTS

Month	Temperature in Degrees F.					
	Alton (40)*	Georgetown (33)	Lindsay (57)	Paris (45)	Huntsville (30)	Kapuskasing (19)
December	22	24	21	26	19	6
January	17	20	16	23	14	—2
February	15	20	26	21	12	2
Winter	18	21	18	23	15	2
March	25	28	26	31	24	14
April	39	41	41	44	39	31
May	52	53	54	56	52	46
Spring	39	41	40	44	38	30
June	62	62	64	65	61	57
July	66	68	68	71	66	62
August	64	66	66	68	64	60
Summer	64	65	66	68	64	60
September	58	59	59	61	57	51
October	46	47	46	49	45	39
November	33	36	34	37	32	22
Fall	46	47	46	49	45	37
ANNUAL	42	44	42	46	41	32
May 1 to Oct. 1	60	61	62	64	60	55

* Years observed.

The Lake Erie Counties region has a climate modified by the influence of the lake as shown by the mean monthly temperature, frost dates, and length of growing season. Although having a warm, early season it is not quite so well favoured as the regions lying to the southwest which include the Niagara Fruit Belt and the counties of Kent and Essex.

The winter temperature ranges from 23° to 24°. Spring temperatures are about 44° and summer temperatures average 68°. The frost-free period is approximately 160 days and the growing season has a uniform length of about 200 days from the middle of April to the first week in November. The average precipitation is 34 inches and the snowfall varies from 40 to 90 inches.

The climate of the South Slopes region is somewhat milder than that of

TABLE 6

PRECIPITATION AT ALTON AND OTHER SELECTED POINTS

Month	Precipitation in Inches					
	Alton (40)*	Georgetown (33)	Lindsay (57)	Paris (45)	Huntsville (30)	Kapuskasing (19)
December	3.26	2.49	2.60	2.59	3.28	1.90
January	3.32	2.59	2.94	2.92	3.09	2.00
February	2.58	2.38	2.39	2.49	2.45	1.06
Winter	9.16	7.46	7.93	8.00	8.82	4.96
March	3.52	2.64	2.42	2.62	2.78	1.56
April	1.98	2.48	2.24	2.73	2.09	1.82
May	2.65	2.84	2.85	3.20	2.85	2.12
Spring	8.15	7.96	7.51	8.55	7.74	5.50
June	3.21	2.72	2.91	3.24	3.69	2.33
July	3.50	3.03	3.07	2.88	2.96	3.43
August	2.77	2.63	2.81	3.18	2.70	2.94
Summer	9.48	8.38	8.79	9.30	9.35	8.70
September	2.94	2.50	3.06	2.84	3.84	3.54
October	2.24	2.54	2.68	2.84	3.44	2.50
November	2.44	2.64	2.86	2.92	3.24	2.39
Fall	7.66	7.68	8.60	8.60	10.52	8.43
ANNUAL	34.41	31.48	32.43	34.45	36.41	27.59
May 1 to Oct. 1	16.07	13.72	14.70	15.34	16.04	14.36

* Years observed.

the regions to the north, but it does not enjoy the moderating influence of the Lake as does the first mentioned area.

The mean annual temperature ranges from 43° to 45°. The average length of the frost-free period ranges from 133 to 147 days which is one to two weeks longer than in the central part of the uplands and certain sections of Simcoe County. The growing season of 192 to 200 days is similar to that of the Lake Erie and Lake Ontario regions.

Annual precipitation varies from 32 to 38 inches with a little less than half falling between April 1 and September 30. Snowfall varies from 50 to 90 inches.

The Simcoe and Kawartha Lakes Region has been separated from the area to the south because of its colder winter and more backward spring. The mean annual temperature is 42° to 44°. The frost-free period ranges from 120 to 140 days, while the growing season of 188 to 195 days is about 5 days shorter than that of the South Slopes.

The precipitation of this region is somewhat lighter than that of those around it, chiefly because a large part of the area lies in the "rain-shadow" caused by the western uplands. Annual averages range from 26 to 34 inches. The snowfall of 55 to 106 inches resembles that of the South Slopes region.

The Western Uplands Region includes the most elevated part of Southern Ontario. The mean annual temperature is similar to that of the Kawartha Lakes ranging from 41° to 44°. The frost-free period of 125 to 140 days is much the same as that of Eastern Ontario, being at least a month shorter than in the milder parts of the adjoining southern and shore regions. The growing season is approximately 195 days long in that part of Peel County included in the Western Uplands Region.

The precipitation is about 34 inches with about 70 inches of snowfall.

Relief

Peel county is divided into two more or less distinct regions by the Niagara escarpment. Immediately south and east of the escarpment is an interlobate moraine with steep irregular topography. In Albion Township it buries all but the top of the escarpment. The remainder of the County area south of the escarpment is a more or less smooth plain sloping gradually towards Lake Ontario. The altitude in this area varies from 250 feet at the lakeshore to 1,000 feet at the lower edge of the escarpment.

The region north of the escarpment is rugged and dissected with moderate to steep slopes. The altitude rises sharply from 1,000 feet at the base of the escarpment to 1,400 feet at the top. The highest point of land occurs in the northern corner of the County where the altitude is 1,550 feet.

Drainage

Rivers draining Peel County flow from north to south emptying into Lake Ontario. The Credit River, draining the western and northern parts of the County, is a rapidly moving stream and has cut a deep channel into the bedrock.

FIG. 6—Outline map of Peel County showing natural drainage courses.

The eastern part of the County is drained by the Etobicoke and Humber Rivers. These rivers present a flood problem during the spring when they overflow their banks. Large areas in need of draining occur in close proximity to these rivers and their tributaries. In most of the areas requiring drainage, the fall is adequate to make drainage improvement comparatively easy. The drainage pattern of the County is shown in Figure 6.

Age

Peel County was covered by ice during the glacial period. The soil materials were deposited by the ice itself, by lakes and streams which existed at the time of and during the retreat of the continental glacier, or by ice and water together. The glacial drift in the surveyed area is derived largely from the underlying bedrock formations of the Paleozoic Era. Part of the County was submerged in the waters of glacial Lake Iroquois. According to Antevs,* Lake Iroquois receded about 18,000 years ago. The materials of this area have been weather-

* Antevs, E. Quaternary Upwarpings of Northeastern North America, Jour. of Geol., Vol. 47, 1939.

ing for a shorter period of time than those of Western Ontario and for a longer period of time than those of Eastern Ontario.

Erosion

The large level to gently sloping areas occurring in the central and southern part of the County are not seriously affected by sheet erosion. However, erosion is serious in the northern part of the County and in sections where moderately and steeply sloping plains exist. Wind erosion occurs on the sandy materials present in Albion and Caledon Townships.

PART III

THE CLASSIFICATION AND DESCRIPTION OF PEEL COUNTY SOILS

Soil is the product of the forces of weathering and soil development acting on the soil parent material deposited or accumulated by geologic agencies. The characteristics of the soil depend on (1) the physical and mineralogical composition of the parent material, (2) the climate occurring since the accumulation of the parent material, (3) the plant and animal life in the soil, (4) the relief, and (5) the length of time these factors have acted on the material. During the process of formation different layers have developed in the soil which can be observed in a vertical cross section of the soil to a depth of about three feet. This cross section including part of the underlying parent material, is referred to as the soil profile and the individual layers are called horizons of the profile. In Peel County the kind and number of horizons found in the soil profile and the sequence in which they occur vary greatly among the different soils.

Two distinct kinds of profile occur in Peel County. Each kind of profile represents what is called a Great Soil Group. Soils characteristic of the Grey-Brown Podzolic, and the Dark Grey Gleisolic Great Soil Groups are dominant in the County.

The Grey-Brown Podzolic soils have developed from calcareous materials and have the following profile characteristics. Under forest they may have a layer of partially decomposed litter from deciduous trees. The surface soil (A_1 horizon) is generally 3 to 4 inches thick, is dark greyish brown to very dark brown in colour, moderately friable, slightly to moderately acid and moderately high in organic matter. This horizon consists of an intimate mixture of mineral and organic materials. The surface of A_1 horizon is underlain by a yellowish brown, pale brown or brownish grey A_2 horizon which is comparatively low in organic matter and slightly to moderately acid in reaction. The thickness of the A_2 horizons may vary considerably in different soils. In the medium and coarse textured soils the upper part of the A_2 horizon is more intensely coloured and is designated as the A_{21} horizon, while the lower more greyish part is designated as the A_{22} horizon.

Under the A_2 horizon lies the B horizon. This layer is darker brown in colour than the A_2 and it contains more clay and sesquioxides than any other horizon in the profile. It is generally slightly acid to neutral in reaction. The B horizon may be subdivided into a transitional subhorizon to the A_2 which is designated as the B_1 horizon and the main or B_2 horizon which contains most of the clay and sesquioxides which have been leached from the A horizons. The B horizon rests upon the unaltered or only slightly weathered calcareous parent material. The following is a generalized profile description of a Grey-Brown Podzolic soil.

A_0 — Accumulated layer of partially decomposed litter from deciduous trees.

A_1 — Dark greyish brown to a very dark brown mineralized humus layer.

A_{21}— Dark yellow-brown layer.

A_{22}— Pale brown layer.

B_2 — Dark brown layer.

C — Light greyish brown calcareous parent material.

In many of the Grey-Brown Podzolic soils of Ontario there is a tendency for a secondary profile to develop in the A horizons of the Grey-Brown Podzolic soils. Generally this secondary development is evidenced by the establishment of a definite leaf mat or A_0 horizon, a thinning out of the dark coloured A_1 horizon and the development of a distinct brownish colour in the upper part of the A_2 horizon. This secondary profile in the upper part of the soil resembles the Brown Podzolic soils in its morphological characteristics. However in some of the coarser textured sandy soils a distinct light grey A_2 horizon, similar to those found in Podzol soils occurs below the thin A_1 or A_0 horizon. These secondary profiles can best be observed under virgin conditions as the distinguishing features are readily destroyed on cultivation.

The Dark Grey Gleisolic soils have developed under poorly drained conditions. They have a dark, friable, granular surface layer, generally 4 to 6 inches thick which is underlain by a mottled brownish grey subsoil that gradually grades into the parent material. In comparison to the well drained soils that have uniformly brownish or yellowish brown subsoils the poorly drained soils have rusty specks and streaks and bluish grey colours in the subsoil. The discoloration or mottling of the subsoil is one of the distinguishing features of poorly drained soils. The Dark Grey Gleisolic soils generally do not have a marked leached layer or layer of accumulation. The following is a generalized description of a Dark Grey Gleisolic soil.

A_0 — Accumulated layer of partially decomposed litter from deciduous trees.

A_1 — Dark grey to very dark grey mineralized layer.

G — Brownish grey mottled mineralized layer.

C — Greyish brown calcareous parent material.

In addition to the above, organic or Bog soils are found in some very poorly drained depressional areas which may receive considerable seepage. Bog soils consist of organic accumulation one to three feet and more in depth. They may differ according to the degree of decomposition of the organic materials from which the soils have developed. The well decomposed dark Bog soils are referred to as "Muck" and the poorly decomposed organic materials as "Peat."

The Alluvial soils occur on some river-flooded plains. They consist of recently deposited material which has not been in place long enough for definite soil horizons to develop. However, layers differing in texture as a result of

periodic flooding, can frequently be observed in the profile of these young alluvial soils.

System of Classification

On the basis of their differentiating characteristics, soils are grouped into categories which can be described and readily recognized. The three categories commonly used in mapping soils are series, type, and phase.

The soil series is a group of soils with genetic horizons similar as to differentiating characteristics and arrangement in the soil profile and developed from a particular type of parent material. Except for texture, particularly in the A_1 horizon, the physicial character and thickness of the horizons do not vary significantly within a series. Such characteristics include colour, structure, organic matter content, reaction, and texture.

The soil type is the principal unit of mapping and is most specific in character. The soil type name consists of a series name plus the textural class name derived principally from the texture of the A_1 horizon. Although the soil type unit is the most specific unit recognized in mapping soils, it should be pointed out that it generally includes a narrow range of conditions. A delineated area may contain in addition to the indicated type, small areas of other related soils frequently poorly drained catenary members. The latter do not form a part of the description of the dominant type. The profile descriptions presented in the report do not represent a specific location but cover the conditions that are most representative. With mapping done on the scale of one inch to the mile a reasonable amount of variability is necessary within mappable units. The range of characteristics tolerated within a series is discussed under the description of the various series.

The soil series developed on similar parent material but differing in profile characteristics due to differences of relief or drainage are included in the soil catena. The catenary relationship of the soils of Peel County is indicated in this report.

DIFFERENTIATION OF PEEL COUNTY SOILS ACCORDING TO SOIL MATERIALS AND DRAINAGE

	Map Symbol	Acreage	% of Total
A. Soils Developed on Coarse, Open, Limestone and Shale Till			
(a) Good drainage — Grey-Brown Podzolic Great Soil Group			
(1) Dumfries loam	Dl	8,200	2.7
(2) Dumfries sandy loam	Ds	2,400	0.8
(b) Poor drainage — Dark Grey Gleisolic Great Soil Group			
(1) Lily loam	Lyl	300	0.1
B. Soils Developed on Medium Textured Limestone and Shale Till			
(a) Good drainage — Grey-Brown Podzolic Great Soil Group			
(1) Harriston loam	Hl	10,400	3.5
(b) Imperfect drainage — Grey-Brown Podzolic Great Soil Group			
(1) Listowel	Lil	1,100	0.4
(c) Poor drainage — Dark Grey Gleisolic Great Soil Group			
(1) Parkhill loam	Pal	2,200	0.7

	Map Symbol	Acreage	% of Total
C. Soils Developed on Medium Textured Shale and Limestone Till			
(a) Good drainage — Grey-Brown Podzolic Great Soil Group			
(1) Woburn loam	Wol	3,800	1.3
(b) Imperfect drainage — Grey-Brown Podzolic Great Soil Group			
(1) Milliken loam	Ml	2,200	0.7
(c) Poor drainage — Dark Grey Gleisolic Great Soil Group			
(1) Lyons loam	Ll	200	0.06
D. Soils Developed on Fine Textured Limestone and Shale Till			
(a) Good drainage — Grey-Brown Podzolic Great Soil Group			
(1) King clay loam	Kic	13,200	4.4
(b) Imperfect drainage — Grey-Brown Podzolic Great Soil Group			
(1) Monaghan clay loam	Moc	200	0.06
E. Soils Developed on Fine Textured Shale and Limestone Till			
(a) Good drainage — Grey-Brown Podzolic Great Soil Group			
(1) Oneida clay loam	Oc	20,500	6.8
(b) Imperfect drainage — Grey-Brown Podzolic Great Soil Group			
(1) Chinquacousy clay loam	Chc	68,500	22.8
(c) Poor drainage — Dark Grey Gleisolic Great Soil Group			
(1) Jeddo clay loam	Jc	5,600	1.9
F. Soils Developed on Poorly Sorted Sands			
(a) Good drainage — Grey-Brown Podzolic Great Soil Group			
(1) Pontypool sandy loam	Psl	46,300	15.4
G. Soils Developed on Well Sorted Sands			
(a) Good drainage — Grey-Brown Podzolic Great Soil Group			
(1) Fox sandy loam	Fsl	6,700	2.2
(2) Fox sand	Fs	6,900	2.3
(3) Brighton sandy loam	Brsl	3,300	1.1
(b) Imperfect drainage — Grey-Brown Podzolic Great Soil Group			
(1) Brady sandy loam	Bsl	1,300	0.4
H. Soils Developed on Well Sorted Gravels			
(a) Good drainage — Grey-Brown Podzolic Great Soil Group			
(1) Caledon loam	Cg	10,200	3.4
(b) Poor drainage — Dark Grey Gleisolic Great Soil Group			
(1) Gilford loam	Gil	1,100	0.4
I. Soils Developed on Sands Underlain by Clay Till			
(a) Good drainage — Grey-Brown Podzolic Great Soil Group			
(1) Bookton sandy loam	Bos	1,000	0.3
(b) Imperfect drainage — Grey-Brown Podzolic Great Soil Group			
(1) Berrien sandy loam	Bes	800	0.3

	Map Symbol	Acreage	% of Total
J. Soils Developed on Lacustrine Clays Underlain by Clay Till			
(a) Good drainage — Grey-Brown Podzolic Great Soil Group			
(1) Cashel clay	Cac	500	0.2
(b) Imperfect drainage — Grey-Brown Podzolic Great Soil Group			
(1) Peel clay	Pec	33,900	13.1
(c) Poor drainage — Dark Grey Gleisolic Great Soil Group			
(1) Malton clay	Mac	5,000	1.7
K. Shallow Soils Over Bedrock			
1. Formed over grey shale			
(a) Good drainage — Grey-Brown Podzolic Great Soil Group			
(1) Brockport clay loam	Bke	700	0.2
(b) Imperfect drainage — Grey-Brown Podzolic Great Soil Group			
(1) Cooksville clay loam	Cke	5,100	1.7
(c) Poor drainage — Dark Grey Gleisolic Great Soil Group			
(1) Missisauga clay loam	Mic	600	0.2
2. Formed over red shale			
(a) Good drainage — Grey-Brown Podzolic Great Soil Group			
(1) Lockport clay	Loc	1,500	0.5
(b) Imperfect drainage — Grey-Brown Podzolic Great Soil Group			
(1) Trafalgar clay	Trc	1,100	0.4
3. Formed over limestone			
(a) Good drainage — Brown Forest Great Soil Group			
(1) Farmington loam	Fl	4,000	1.3
L. Organic Soils			
(a) Very poor drainage — Bog Great Soil Group			
(1) Muck	M	4,500	1.5
M. Recent Alluvial Materials			
(1) Bottom Land	B.L.	25,800	8.6

A. SOILS DEVELOPED ON COARSE, OPEN LIMESTONE AND SHALE TILL

The Dumfries catena is developed on coarse limestone and shale materials that were deposited in varying depths by the melting ice and have not been modified to any extent by marine waters. The till is composed largely of Lockport dolomite. The Dumfries series is the well drained member, and the Lily series is the poorly drained member of the Dumfries catena.

(a) *Good Drainage*

Dumfries Loam (8,200 acres)

The Dumfries series is well drained with steep irregular slopes and occurs in Caledon Township. Profiles exhibit the characteristics of the Grey-Brown Podzolic Great Soil Group. The following is a profile description of Dumfries loam developed under hardwood vegetation.

Complex topography and stones make cultivation difficult on the Dumfries soils.

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–3 inches loam; very dark brown (10 YR 2/3); fine crumb structure; friable consistency; frequent stones; pH — 6.3.

A_{21}— 3–12 inches loam; yellowish brown (10 YR 5/6); weak platy structure; friable consistency; few stones; pH — 5.5.

A_{22}— 12–17 inches loam; yellowish brown (10 YR 5/4); weak platy structure; friable consistency; few stones; pH — 5.1.

B_1 — 17–22 inches loam; dark yellowish brown (10 YR 4/4); medium nuciform structure; friable consistency; few to frequent stones; pH — 6.5.

B_2 — 22–34 inches clay loam; dark brown (10 YR 4/3); medium nuciform structure; hard consistency; very stony; pH — 6.7.

C — Stony sandy loam till; pale brown (10 YR 6/3); single grain structure; loose consistency; many stones and boulders; calcareous; pH — 7.4.

The topography of Dumfries loam is steeply sloping; the slopes being irregular. Both external and internal drainage is good. However, imperfectly and poorly drained potholes, which are too small to be delineated on the map, the scale of which is one inch to the mile, occur which are included with the well drained member. Stones occur throughout the profile which usually interfere with cultivation. The soil is susceptible to sheet erosion which is severe in many sections. Dumfries loam has a medium to low fertility level

being low to very low in phosphorus and medium to low in potash and nitrogen. The organic matter content is medium to low.

Most of the Dumfries loam has been cleared and present forested areas consist of small woodlots. Beech and sugar maple occur most frequently with basswood, ironwood and elm occurring in lesser amounts.

Agriculture

Most of the Dumfries loam has been cultivated and is used chiefly for general farming. Cereal grains, legumes, hay and pasture are fairly well adapted to this soil.

The loamy texture and porous nature of the parent material permit early cultivation. Erosion and the large number of stones occurring throughout the profile are the greatest hazards to cultivation. Since the steep irregular slopes prohibit the use of special conservation practices, such as contour plowing, long rotations should be used to prevent erosion. The steeper slopes would be better left under a permanent cover of grass or trees.

The type is well supplied with lime and suited to the growing of legumes. This is particularly desirable in areas where cattle are raised for dairying or beef and large amounts of forage crop materials are needed.

This soil requires additions of barnyard manure and fertilizers high in phosphorus and nitrogen.

Dumfries Sandy Loam (2,400 acres)

Dumfries sandy loam differs from the loam chiefly in surface texture. Occasionally the underlying till is quite sandy.

(b) *Poor Drainage*

Lily Loam (300 acres)

Lily loam is mapped in association with the Dumfries soils and usually occurs in depressional to very gently sloping areas. It is the poorly drained member of the Dumfries catena.

The profile belongs to the Dark Grey Gleisolic Great Soil Group and exhibits the following characteristics:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–6 inches loam; very dark brown (10 YR 2/2); coarse crumb structure; friable consistency; stony; pH — 7.2.

G_1 — 6–16 inches loam; greyish brown (10 YR 5/2); mottled; massive structure; friable consistency; stony; pH — 7.3.

C — Stony calcareous till; pale brown (10 YR 6/3); single grain structure; loose consistency; very stony; pH — 7.8.

Stone fences are often found on Lily loam.

Small areas of Lily loam occur in association with the Dumfries series. Because of topographic position the natural drainage is poor. This condition is often aggravated by seepage from the surrounding higher land.

A large proportion of the Lily remains in woodland where the most frequently occurring trees are elm, ash, cedar, willow, and soft maple. The natural fertility level is medium.

Agriculture

Areas of Lily loam not in woodland are chiefly used for pasture. When cultivated it is a late soil in the spring and at best is only fairly well suited to the production of cereal grains. The poor drainage makes it ill-suited for the production of legumes. Timothy, hay and permanent pasture do fairly well and fair yields of buckwheat are obtained.

B. SOILS DEVELOPED ON LOAMY LIMESTONE AND SHALE TILL

Soils developed on loamy limestone and shale till occur in the northwest part of Caledon Township. The materials are dominantly limestone in nature with varying amounts of shale present. The till materials allow for free movement of water through the profile. The soils are well supplied with lime, free carbonates occurring in the underlying till. They lack the stoniness of the soils of the Dumfries catena and are somewhat better supplied with plant nutrients. The Harriston series is the well drained member, the Listowel series the imperfectly drained member and the Parkhill series the poorly drained member of the Harriston catena.

(a) Good Drainage

Harriston Loam (10,400 acres)

Found in the northern part of Caledon Township, Harriston loam occurs on smooth moderately sloping topography. It exhibits the characteristics of

the Grey-Brown Podzolic Great Soil Group as illustrated by the following profile description.

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–5 inches loam; dark greyish brown (10 YR 4/2); fine granular structure; friable consistency; few stones; pH — 6.7.

A_{21} — 5–14 inches loam; yellowish brown (10 YR 5/4); weak platy structure; friable consistency; few stones; pH — 6.2.

A_{22} — 14–17 inches loam; light yellowish brown (10 YR 6/4); weak platy structure; friable consistency; occasional stones; pH — 6.0.

B_2 — 17–27 inches clay loam; dark brown (10 YR 4/3); medium nuciform structure; friable consistency; frequent stones; pH — 7.0.

C — Stony loam till; pale brown (10 YR 6/3); medium nuciform structure; hard consistency; calcareous; pH — 7.8.

Harriston loam has good external and internal drainage and has developed under vegetation similar to that of the Dumfries series. The most commonly occurring trees are hard maple, beech, basswood, and ironwood. The type is susceptible to sheet erosion and chemical tests show it to be fairly well supplied with plant nutrients.

Agriculture

The Harriston loam is well suited to dairy, beef, or general farming and some good farms have been established on this type. Most farm crops commonly grown in Peel County are produced with reasonably good success. The soil is well adapted to the growing of cereal grains, alfalfa, hay, pasture and turnips.

Where livestock are kept, the use of forage crops and barnyard manure provides the basis for an effective and sound erosion control program. A large proportion of the type has been cleared and is in regular crop rotation.

Fertility levels should be maintained by additions of barnyard manure and commercial fertilizers.

(b) Imperfect Drainage

Listowel Loam (1,100 acres)

The Listowel loam is the imperfectly drained member of the Harriston catena. The horizons are not as well defined as those of the Harriston loam and the profile exhibits characteristics of a weakly developed Grey-Brown Podzolic soil. The following characteristics are those exhibited by Listowel loam.

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–5 inches loam; very dark greyish brown (10 YR 3/2); fine granular structure; friable consistency; few stones; pH — 6.8.

A_2 — 5–12 inches loam; yellowish brown (10 YR 5/6); mottled; weak platy structure; friable consistency; few stones; pH — 6.5.

B_2 — 12–21 inches clay loam; dark brown (10 YR 4/3); mottled; medium nuciform structure; friable consistency; stony; pH — 7.2.

C — Loam till; pale brown (10 YR 6/3); medium nuciform structure; hard consistency; stony; calcareous; pH —7.8.

The internal and external drainage is imperfect and the topography is smooth gently sloping. Stones occur in varying proportions and in some instances may interfere with cultivation. There has been practically no erosion on the type. Tree growth in existing woodlots consists mainly of soft maple and elm.

Agriculture

Listowel loam is used largely for general farming. It occurs in association with the Harriston loam, and often supports pasture growth when left in the undrained state. Where the soil is drained a wider range of crops can be grown. Cereal grains do fairly well, but legumes, particularly alfalfa, are not tolerant of the imperfect drainage conditions. The organic matter content is medium and the soil is well supplied with lime. Low phosphorus levels should be raised by the use of phosphatic fertilizers.

(c) *Poor Drainage*

Parkhill Loam (2,200 acres)

Parkhill loam is mapped in association with the Listowel and Harriston soils and usually occurs in very gently sloping to depressional areas. It is the poorly drained member of the Harriston catena. The Parkhill series has been mapped in many counties in Ontario as a poorly drained loamy limestone till soil. Hence, it occurs in other catenas under the system of soil classification. The profile belongs to the Dark Grey Gleisolic Great Soil Group and exhibits the following characteristics:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–7 inches loam; very dark brown (10 YR 2/2); fine granular structure; friable consistency; few stones; pH — 7.0.

G — 7–16 inches loam; greyish brown (10 YR 5/2); mottled; medium nuciform structure; friable consistency; few to frequent stones; pH — 7.2.

C — Loam till; pale brown (10 YR 6/3); mottled; medium nuciform structure; hard consistency; stony; calcareous; pH — 7.6.

Because of its topographic position the natural drainage of Parkhill loam is poor. This condition is often aggravated by seepage from the surrounding higher land. The natural vegetation consists mainly of white cedar, elm, soft maple, hemlock and willow.

Agriculture

A large proportion of the Parkhill remains in woodland. Areas not in woodland are often used for pasture. When cultivated it is a late soil in the spring and at best is only fairly well suited to the production of cereal grains. Poor drainage makes it ill-suited for the production of legumes. Timothy, hay and permanent pasture do fairly well and fair yields of buckwheat are obtained. Where the soil is cultivated applications of phosphatic fertilizer are required to maintain fertility levels.

C. SOILS DEVELOPED ON MEDIUM TEXTURED SHALE AND LIMESTONE TILL

Similar to all till soils, the materials on which the soils of this group developed were deposited by glacial action. The materials consist dominantly of shale with varying amounts of limestone. These soils which have formed mainly from shale till are somewhat more acidic than those developed on the limestone and shale till. Free carbonates are present in the underlying till.

Three series were mapped in Peel County. The Woburn series is the well drained member, the Milliken series is the imperfectly drained member, and the Lyons series is the poorly drained member of the Woburn catena.

(*a*) *Good Drainage*

Woburn Loam (3,800 acres)

Found in Chinguacousy and Caledon townships, Woburn loam occurs on smooth moderately rolling topography. It exhibits the characteristics of the Grey-Brown Podzolic Great Soil Group as shown by the following profile description.

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–4 inches loam; very dark greyish brown (10 YR 3/2); fine granular structure; friable consistency; few stones; pH — 6.1.

A_{21}— 4–14 inches loam; yellowish brown (10 YR 5/4); weak platy structure; friable consistency; few stones; pH — 5.8.

A_{22}— 14–17 inches sandy loam; reddish yellow (7.5 YR 6/6); weak platy structure; very friable consistency; few stones; pH — 5.7.

B_2 — 17–25 inches clay loam; dark brown (7.5 YR 4/4); coarse nuciform structure; hard consistency; few stones; pH — 6.6.

B_3 — 25–37 inches clay loam; brown (10 YR 5/3); coarse nuciform structure; hard consistency; few stones; pH — 6.8.

C — Loam till; brown (7.5 YR 5/4); medium nuciform structure; hard consistency; stony; calcareous; pH — 7.8.

Although the topography of the Woburn loam is usually moderately sloping, steep slopes occur in some localities. The type is susceptible to sheet erosion and has suffered noticeably where slopes are steep. Both external and internal drainage is good. Much of the Woburn loam has been cleared and present forested areas are usually confined to small woodlots. Beech and hard maple occur in the largest numbers with basswood, ironwood, and soft maple occurring in lesser amounts.

Agriculture

Woburn loam is well adapted to the growing of cereal grains, corn and legumes and is used chiefly for general farming.

The loamy texture and porous parent material permit early cultivation. The greatest hazard to cultivation is the danger of erosion.

The type is fairly well supplied with lime and suited to the growing of legumes. Short rotations should be discouraged since too frequent cultivation would increase the erosion hazard and impair soil structure. Additions of mineral fertilizer are required to build up low phosphate levels and to maintain the level of potash. Organic matter content should be maintained by frequent additions of manure. The nature of these parent materials and the good drainage make this type ideal for building sites.

(b) *Imperfect Drainage*

Milliken Loam (2,200 acres)

The Milliken is the imperfectly drained member of the Woburn catena. It is one of the minor types found in the County and it occurs in the northern

part of Chinguacousy Township. A common Milliken loam profile exhibits the following characteristics:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–5 inches loam; very dark greyish brown (10 YR 3/2); fine granular structure; friable consistency; few stones; pH — 6.5.

A_2 — 13 inches loam; yellowish brown (10 YR 5/4); very slightly mottled; weak platy structure; friable consistency; few stones; pH — 6.2.

B_2 — 13–24 inches clay loam; dark brown (7.5 YR 4/4); slightly mottled; coarse nuciform structure; hard consistency; few stones; pH — 6.8.

B_3 — 24–31 inches clay loam; brown (10 YR 5/3); medium nuciform structure; friable consistency; few stones; pH — 7.0.

C — Loam till; brown (7.5 YR 5/4); medium nuciform structure; hard consistency; stony; calcareous; pH — 7.8.

The topography of the Milliken loam ranges from smooth gently sloping to smooth moderately sloping. Little erosion occurs on this type except where moderate slopes cause rapid runoff and soil is lost. Both external and internal drainage is moderately good.

Tree cover in existing woodlots is made up dominantly of elm and soft maple. Basswood, ash and hard maple also occur.

Agriculture

In Peel County this type is used for general farming and dairying. It is suited to the growth of cereal grains, corn, and hay and can be used for growing vegetable crops where climate permits.

The organic matter supply is medium and fertility levels can be maintained by the application of barnyard manure and mineral fertilizers. Good crops of alfalfa can be grown even though the soil is only moderately well drained.

(c) Poor Drainage

Lyons Loam (200 acres)

Lyons loam is mapped in association with Milliken and Woburn soils and is the poorly drained member of the Woburn catena. The profile belongs to the Dark Grey Gleisolic Great Soil Group and exhibits the following characteristics.

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–7 inches loam; very dark greyish brown (10 YR 3/2); fine granular structure; friable consistency; pH — 6.8.

G — 7–15 inches loam; greyish brown (10 YR 5/2); mottled; medium nuciform structure; friable consistency; few stones; pH — 7.0.

C — Brown (10 YR 5/3) calcareous till; stony; pH — 7.8.

The topography is smooth very gently sloping and erosion presents no problem. Because of its topographic position the natural drainage is poor.

A large proportion of the Lyons remains in woodland where the most frequently occurring trees are elm, ash, cedar, willow, soft maple and hemlock.

Agriculture

Areas not in woodland are often used as pasture. The production of most crops is limited by the poor drainage conditions. However, crop production can be improved by the installation of tile drains where economically feasible. It is very doubtful if the cost of draining would be warranted for pasture crops.

Timothy, hay and buckwheat do fairly well but the soil is ill-suited to the production of legumes because of poor drainage.

D. SOILS DEVELOPED ON FINE TEXTURED LIMESTONE AND SHALE TILL

A fairly broad expanse of fine textured soils occur in Albion Township. The soil parent materials are composed chiefly of angular limestone and shale stones interspersed among a clayey matrix. The presence of the till materials allows fairly free movement of water through the profile and facilitates internal drainage. The soils are well supplied with lime, free carbonates occurring in the underlying till.

Two series were mapped in this group, the King and Monaghan. The King series is the well drained member of the King catena and the Monaghan is the imperfectly drained member.

(a) Good Drainage

King Clay Loam (13,200 acres)

Found in Albion Township, the King clay loam occurs on smooth moderately sloping topography except along the Humber River where dissection has created an area of steep, irregular slopes. Formed from clayey till deposits, the type exhibits Grey-Brown Podzolic characteristics. A King clay loam profile exhibits the following characteristics:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–5 inches clay loam; greyish brown (10 YR 5/2); medium granular structure; friable consistency; stonefree; pH — 6.8.

A_{21}— 5–11 inches clay loam; brown (10 YR 5/3); weak platy structure; friable consistency; stonefree; pH — 6.5.

A_{22}— 11–13 inches clay loam; light yellowish brown (10 YR 6/4); weak platy structure; friable consistency; stonefree; pH — 6.4.

B_2 — 13–30 inches clay; dark brown (10 YR 4/3); coarse blocky structure; hard consistency; stonefree; pH — 7.0.

C — Clay till; brown (10 YR 5/3); prismatic structure; hard consistency; calcareous; few stones; pH — 7.8.

Both internal and external drainage is good. Erosion is severe particularly where slopes are steep. These soils have developed under a vegetation consisting mainly of soft maple and elm and are fairly well supplied with plant nutrients.

Agriculture

The King clay loam is well suited to dairy farming and some good farms have been established on this type. Most of the farm crops grown on this soil in Peel County have been produced with reasonably good success. The type is well adapted to the growing of cereal grains, hay and pasture.

Susceptibility to erosion is the chief hazard limiting the production of some crops. However, where dairy farming is practised, the use of forage crops and barnyard manure provides the basis for an effective and sound erosion control program. The internal drainage and supply of plant nutrients is sufficiently good to permit the growth of alfalfa and other legumes. Potash and phosphate are the main requirements for legumes on these soils.

(b) Imperfect Drainage

Monaghan Clay Loam (200 acres)

A small area in Albion Township is occupied by Monaghan clay loam. This soil which has been previously mapped in other parts of Ontario has developed on calcareous fine textured till. It is a member of the Grey-Brown Podzolic Great Soil Group and exhibits the following characteristics:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–5 inches clay loam; very dark grey (7.5 YR 3/0); medium granular structure; friable consistency; stonefree; pH — 6.8.

A_2 — 5–13 inches clay loam; brown (7.5 YR 5/4); slightly mottled; medium nuciform structure; friable consistency; stonefree; pH — 6.5.

B_2 — 13–25 inches clay; dark greyish brown (10 YR 4/2); mottled; coarse blocky structure; hard consistency; stonefree; pH — 7.0.

C — Clay till; brown (10 YR 5/3); prismatic structure; hard consistency; calcareous; few stones; pH — 7.8.

The topography is smooth gently sloping and both internal and external drainage is slow. The type has not suffered greatly from sheet erosion and chemical tests show it to be fairly well supplied with plant nutrients.

Although most of the land has been cleared existing woodlots show the tree cover to be dominantly soft maple and elm. Ash, ironwood, basswood, and beech are also common.

Agriculture

Monaghan clay loam is used chiefly for general farming and dairying. Fairly good yields of cereal grains, hay and pasture can be obtained although crop production is limited, to some extent, by inadequate drainage. During dry seasons Monaghan soils produce good yields because of their fairly high moisture reserve.

The type is fairly well supplied with plant nutrients and the organic matter supply can be maintained by applications of barnyard manure. Maintenance of good tilth is necessary to the successful management of the Monaghan soil.

E. SOILS DEVELOPED ON FINE TEXTURED SHALE AND LIMESTONE TILL

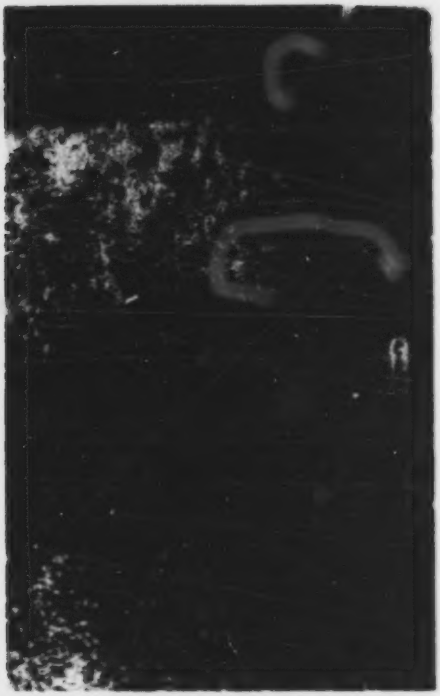
A large proportion of the southern and central part of the County is made up of soils developed on clay till derived dominantly from shale and to a lesser extent from limestone materials. The amount of shale present in this till is considerably greater than in the till of the King catena. The till is stony and calcareous.

The Oneida catena is mapped where these materials occur and it consists of the well drained Oneida series, the imperfectly drained Chinguacousy series and the poorly drained Jeddo series.

(a) *Good Drainage*

Oneida Clay Loam (20,500 acres)

Occurring in the southern section of Peel County, Oneida clay loam is characterized by smooth moderately sloping topography. It is characteristic



The Oneida clay loam is characteristic of the Grey-Brown Podzolic soils. Note the well developed A_2 and B horizon.

of the Grey-Brown Podzolic Great Soil Group as shown by the following profile description:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–5 inches clay loam; very dark greyish brown (10 YR 3/2); fine granular structure; friable consistency; few stones; pH — 5.6.

A_{21} — 5–12 inches clay loam; yellowish brown (10 YR 5/4); weak platy structure; friable consistency; stonefree; pH — 5.4.

A_{22} — 12–15 inches clay loam; brownish yellow (10 YR 6/6); weak platy structure; friable consistency; stonefree; pH — 5.5.

B_2 — 15–29 inches clay; dark brown (10 YR 4/3); coarse blocky structure; hard consistency; few stones; pH — 6.4.

C — Clay till; pale brown (10 YR 6/3); prismatic structure; hard consistency; calcareous; stony; pH — 7.4.

Dissection by stream courses produces the smooth moderately rolling topography of the Oneida clay loam. Although percolation of moisture through the profile is slow, run-off is rapid resulting in a well drained soil. The soil is susceptible to erosion.

Oak, sugar maple, pine, beech, and elm are the tree species most commonly occurring in the woodlots. Elm occurs particularly at the bottom of the slopes.

Agriculture

Most of the Oneida clay loam is cleared of trees and is used for dairying and general farming. The soil is well adapted to the growing of cereal grains, hay and pasture.

The internal drainage and supply of plant nutrients is sufficiently good to permit the growing of alfalfa and other legumes. In some areas liming is needed before good crops of alfalfa can be grown. Where dairy farming is practised the growing of forage crops and the use of barnyard manure provide the basis for an excellent soil management program.

The soil is usually low in organic matter which should be built up and maintained by frequent additions of barnyard manure. Phosphate, potash, and nitrogen levels should be maintained with additions of mineral fertilizer.

(b) *Imperfect Drainage*

Chinguacousy Clay Loam (68,500 acres)

The Chinguacousy series is the imperfectly drained member of the Oneida catena. The parent material is fairly high in limestone but shale is present in such a quantity that it has a pronounced effect on the profile developed. A typical profile developed under woodlot vegetation exhibits the following characteristics:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–6 inches clay loam; dark grey (10 YR 4/1); medium granular structure; friable consistency; few stones; pH — 5.5.

A_2 — 6–12 inches clay loam; yellowish brown (10 YR 5/4); mottled; weak platy structure; friable consistency, stone-free; pH — 5.1.

B_2 — 12–24 inches clay; dark brown (10 YR 4/3); mottled; coarse blocky structure; hard consistency; few stones; pH — 6.5.

C — Clay till; pale brown (10 YR 6/3); prismatic structure; hard consistency; calcareous; few stones; pH — 7.4.

The A_1 horizon of the imperfectly drained Chinguacousy clay loam is mottled and not as well developed as in the well drained Oneida clay loam.

The topography is smooth gently sloping and erosion is slight. Drainage is imperfect.

The natural vegetation consists mainly of elm and soft maple with ash and oak also occurring

Agriculture

The Chinguacousy series is used chiefly for dairying although a certain amount of general farming is also practised. The soil is well suited to the production of cereal grains and forage crops but the growth of alfalfa may be limited by inadequate drainage and the acid reaction. In addition to the crops commonly grown in connection with dairy farming cash crops, such as, wheat, corn, beans, and tomatoes can be grown where climate permits.

Inherently the Chinguacousy series is low in organic matter, phosphorus, and calcium and only moderately well supplied with potassium. Liming should be beneficial in most areas and fertility levels should be maintained with additions of mineral fertilizer and barnyard manure. The installation of tile drains

would permit the production of a wider range of crops and earlier spring cultivation.

(c) Poor Drainage

Jeddo Clay Loam (5,600 acres)

Small areas of Jeddo clay loam occur in the southern part of the County. It is the poorly drained member of the Oneida catena and is characteristic of the Dark Grey Gleisolic Great Soil Group.

The following is a profile description of Jeddo clay loam found under woodlot vegetation.

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–8 inches clay loam; very dark brown (10 YR 2/2); medium granular structure; friable consistency; stonefree; pH — 6.5.

G_1 — 8–16 inches clay; dark greyish brown (10 YR 4/2); mottled; medium nuciform structure; plastic consistency; stonefree; pH — 6.8.

G_2 — 16–37 inches clay; yellowish brown (10 YR 5/4); mottled; coarse blocky structure; plastic consistency; stonefree; pH — 7.0.

C — Clay till; pale brown (10 YR 6/3); prismatic structure; plastic consistency; calcareous; few stones and grit; pH — 7.4.

The Jeddo clay loam has smooth very gently sloping topography and is poorly drained. The natural vegetation in the woodlots consists mainly of elm, ash, and cedar.

Agriculture

Crop growth on the Jeddo clay loam is limited by poor drainage. In its natural state the soil is best used for hay and pasture, but a wider range of crops can be grown when drainage is improved.

The type is medium to high in organic matter and potash. Phosphate levels are medium to low and there is usually sufficient calcium for most crop growth.

F. SOILS DEVELOPED ON POORLY SORTED SANDS

The materials on which the soils of this group developed were deposited by glacio-fluvial action. These materials occur in broad areas extending across Albion and Caledon Townships and consist mainly of sand with pockets of gravel and till also present.

(a) Good Drainage

Pontypool Sandy Loam (46,300 acres)

The Pontypool sandy loam is the only catenary member recognized and mapped and is well drained. The profile is well developed and characteristic

of the Grey-Brown Podzolic soils. The characteristics of the Pontypool sandy loam are illustrated by the following profile description.

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–4 inches sandy loam; dark greyish brown (10 YR 4/2); fine crumb structure; very friable consistency; few stones; pH — 6.6.

A_{21}— 4–19 inches sand; yellowish brown (10 YR 5/4); very weak platy structure; very friable consistency; stonefree; pH — 6.4.

A_{22}— 19–24 inches sand; light yellowish brown (10 YR 6/4); single grain structure; loose consistency; stonefree; pH — 6.4.

B_2 — 24–34 inches sandy loam; dark brown (10 YR 4/3); medium nuciform structure; friable consistency; few stones; pH — 6.8.

C — Sand; greyish brown (10 YR 5/2); single grain structure; loose consistency; calcareous; few to frequent stones; pH — 7.8.

The Pontypool sandy loam is a coarse textured, well drained to excessively drained soil on irregular steeply sloping topography. Although most of the area mapped has been cleared, it would appear that the Pontypool sandy loam developed under a tree cover of hard maple, beech and spruce. When cultivated, the surface soil is a greyish brown sandy loam low in organic matter. The soil is low in the elements phosphorus and potassium.

Agriculture

The Pontypool sandy loam is an early soil, because of the porous nature of the materials, and can be cultivated with ease. It is used for general farming, dairying and some cash crops are grown. A large part of the area mapped as Pontypool sandy loam is used for pasture.

Crop production is limited by low fertility, droughtiness and susceptibility to wind erosion. Cash crops such as potatoes, peas, tomatoes, and corn do well when the soil is heavily fertilized. However, row crops should not be grown intensively because of the danger of excessive loss of valuable topsoil. The soil should be kept under cover for as great a proportion of time as possible. Because of low fertility levels the type is only fairly well suited for the production of cereal grains, hay, and pasture.

The organic matter content is low and adequate amounts of manure should be added to build up and maintain this important component.

G. SOILS DEVELOPED ON WELL SORTED SANDS

Only a small proportion of the soils of Peel County have developed on well sorted sandy materials deposited by slowly moving water. These outwash materials assume the form of sand bars, outwash plains or beaches. The

materials vary from a medium lime to a high lime content and are stonefree. The Brighton catena has developed on high lime materials and the Fox catena has developed on medium lime materials. The well drained Brighton series is the only member of the Brighton catena recognized and mapped in Peel County. In the Fox catena the well drained Fox series and the imperfectly drained Brady series have been mapped.

(a) *Good Drainage*

Brighton Sandy Loam (3,300 acres)

Brighton sandy loam is formed on coarse sandy outwash material and has smooth gently sloping topography. Small areas occur in Albion, Caledon, and Toronto Townships. Where the profile has been undisturbed shallow podzols have developed in the A horizon of the former Grey-Brown Podzolic profile.

The profile of the Brighton sandy loam is described as follows:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–4 inches sandy loam; dark greyish brown (10 YR 4/2); fine crumb structure; very friable consistency; stonefree; pH — 6.5.

A_{21}— 4–16 inches sand; brownish yellow (10 YR 6/8); single grain structure; loose consistency; stonefree; pH — 6.2.

A_{22}— 16–19 inches sand; very pale brown (10 YR 7/3); single grain structure; loose consistency; pH — 6.4.

B_2 — 19–22 inches sand; yellowish brown (10 YR 5/6); weak nuciform structure; loose consistency; stonefree; pH — 7.0.

C — Sand; light brownish grey (10 YR 6/2); single grain structure; loose consistency; calcareous; pH — 7.8.

The B horizon differs from the horizons above and below it only in colour. In spite of the smooth gently sloping topography, Brighton sandy loam is well drained because the porosity of the materials facilitates the rapid percolation of moisture. The organic matter content of the soil is low, resulting in a low moisture holding capacity.

Most of the forest cover has been removed but remaining woodlots show the tree cover to have consisted mainly of beech, sugar maple, pine and oak.

Agriculture

Low organic matter, droughtiness and low natural fertility limit the capability of this type for the production of most crops. The soil is fairly well suited to cash crops such as potatoes, corn and peas, and provided adequate supplies of manure and fertilizers are applied, yields are adequate.

The vegetative cover in permanent pastures is usually not thick enough to prevent soil loss by wind erosion. Permanent pasture, cereal grains, and hay will produce greater yields when adequate fertility levels are established and maintained.

Fox Sandy Loam (6,700 acres)

Fox sandy loam is found in the southern part of the County. It has developed on well sorted sandy outwash materials of medium lime content, and is characteristic of the Grey-Brown Podzolic Great Soil Group. Unlike the Brighton series, the Fox series has a distinct textural B horizon as is shown in the following profile description of Fox sandy loam.

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–5 inches sandy loam; very dark greyish brown (10 YR 3/2); medium crumb structure; very friable consistency; stonefree; pH — 6.3.

A_{21} — 5–22 inches sand; yellowish brown (10 YR 5/4); single grain structure; loose consistency; stonefree; pH — 6.0.

A_{22} — 22–25 inches sand; pale brown (10 YR 6/3); single grain structure; loose consistency; stonefree; pH — 6.0.

B_2 — 25–38 inches loam; dark brown (10 YR 4/3); medium nuciform structure; friable consistency; stonefree; pH — 6.8.

C — Sand with occasional gravel strata; grey (10 YR 5/1); single grain structure; loose consistency; calcareous; pH — 7.6.

Much of the Fox sandy loam found near the lakeshore in Peel County has a characteristic double profile consisting of a Podzol profile superimposed on a Grey-Brown Podzolic profile. The following is a description of this double profile as it occurs under virgin conditions:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–3 inches sandy loam; black (10 YR 2/1); fine crumb structure; very friable consistency; stonefree; pH — 5.0.

A_2 — 3–4 inches sand; grey (10 YR 5/1); single grain structure; loose consistency; stonefree; pH — 4.2.

B_2 — 4–9 inches sand; strong brown (7.5 YR 5/6); single grain structure; loose consistency; stonefree; pH — 5.8.

B_3 — 9–23 inches sand; brownish yellow (10 YR 6/6); single grain structure; loose consistency; stonefree; pH — 6.0.

C — 23–35 inches sand; light yellowish brown (10 YR 6/4); single grain structure; loose consistency; non-calcareous; pH — 6.5.

B — 35–39 inches sandy loam; brown (10 YR 5/3); weak nuciform structure; friable consistency; stonefree; pH — 7.2.

C — Sand; grey (10 YR 5/1); single grain structure; loose consistency; calcareous; pH — 7.6.

Fox sandy loam is well drained occurring on smooth gently sloping topography. The type is low in organic matter content and is low in potassium and phosphate. Soil loss by wind erosion is severe when the soil is left uncovered for long periods of time.

Agriculture

The Fox series is used extensively for the production of specialized crops, being well suited to the production of tree fruits, vegetables, and small fruits. The porous soil materials allow rapid percolation of moisture, permitting early spring cultivation. Its good drainage, workability, coarse texture and uniformity make it especially suited to early crops.

Crop production is limited by low fertility, susceptibility to erosion, and droughtiness. Nitrogen, phosphate and potash levels should be increased and maintained by additions of mineral fertilizer. Cover crops and manure should be used to build up and maintain the organic matter content and to help prevent soil loss due to wind erosion. Because high value crops can be grown on Fox soils, heavy applications of fertilizer are profitable and desirable.

Fox Sand (6,900 acres)

Fox sand occurs in a few large areas in the southern part of the County. Its profile characteristics are similar to those of Fox sandy loam except for surface texture. The levels of phosphorus, potash and nitrogen are low, and additions of fertilizers containing these elements are necessary.

(b) *Imperfect Drainage*

Brady Sandy Loam (1,300 acres)

Brady sandy loam is found in association with the Fox series in the southern part of the County. It is the imperfectly drained member of the Fox catena and is a Grey-Brown Podzolic soil. The profile of the Brady sandy loam developed under tree cover is described below.

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–5 inches sand loam; very dark greyish brown (10 YR 3/2); medium crumb structure; very friable consistency; stonefree; pH — 6.5.

A_2 — 5–14 inches sand; yellowish brown (10 YR 5/4); mottled; single grain structure; loose consistency; stonefree; pH — 6.1.

B_2 — 14–26 inches loam; dark brown (10 YR 4/3); mottled; medium nuciform structure; friable consistency; stonefree; pH — 6.8.

C — Sand with occasional gravel strata; grey (10 YR 5/1); single grain structure; loose consistency; calcareous; pH — 7.6.

The topography is smooth gently sloping. Internal drainage is rapid and external drainage is low. Most of the type has been cleared but soft maple and elm are the dominant tree species found in the existing woodlots. The type is low in potassium and phosphorus and is medium to low in organic matter content.

Agriculture

Brady sandy loam is mainly used for growing vegetables, tree fruits and small fruits since most of the type occurs near the lakeshore where the climate is moderated by the presence of a large body of water.

Yields on this soil are low unless adequate amounts of fertilizer are used. Best results are obtained when drainage is improved. Organic matter, such as green manure, stable manure and muck, incorporated into the soil, will greatly benefit the plants.

The improvement of the Brady soils involves soil management that tends to make the surface soil more uniform in organic matter, moisture-holding capacity, and general fertility.

H. SOILS DEVELOPED ON WELL SORTED GRAVELS

The parent material of this group of soils was deposited in slowly moving water and occurs as outwash plains. Soil parent materials contain large amounts of shale intermixed with calcareous materials, being similar in composition to the shale tills of the area. The soils on the gravelly materials are members of the Caledon catena, of which the Caledon is the well drained member and the Gilford the poorly drained member.

(a) *Good Drainage*

Caledon Loam (10,200 acres)

The Caledon series is developed on well sorted gravelly materials derived largely from shale and containing smaller proportions of calcareous and siliceous

A profile of Caledon loam developed on shale and limestone materials.

materials. The Caledon is the well drained member of the catena of the same name and exhibits the characteristics of the Grey-Brown Podzolic Great Soil Group. The following is a description of a profile developed under tree cover.

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–4 inches loam; very dark greyish brown (10 YR 3/2); fine granular structure; very friable consistency; few stones; pH — 6.5.

A_{21} — 4–18 inches sandy loam; yellowish brown (10 YR 5/8); weak platy structure; friable consistency; few stones; pH — 5.8.

A_{22} — 18–21 inches sandy loam; light yellowish brown (10 YR 6/4); weak platy structure; very friable consistency; stonefree; pH — 5.8.

B_2 — 21–36 inches clay loam; dark brown (7.5 YR 4/4); coarse nuciform structure; firm consistency; stony; pH — 6.8.

C — Well sorted gravel; brown (10 YR 5/3); single grain structure; loose consistency; calcareous; shaley; pH — 7.6.

The topography of the Caledon loam is smooth moderately sloping.

Agriculture

The Caledon loam in Peel County is used chiefly for dairying and general farming. It is fairly well suited to the growth of cereal grains, hay and pasture. Yields may be limited by low inherent fertility. The soil has some characteristics favourable for the production of certain high value cash crops, such as, tree fruits and small fruits, but it is located in a climatic belt that does not favour the growth of such crops.

The low nitrogen, phosphorus, and potassium content can be built up and maintained by additions of commercial fertilizer. Barnyard manure should be used to maintain adequate organic matter levels. Erosion is moderate and can be controlled by the use of long rotations.

(b) Poor Drainage

Gilford Loam (1,100 acres)

The Gilford series is the poorly drained member of the Caledon catena and exhibits the characteristics of the Dark Grey Gleisolic Great Soil Group. Only a very small area of the type occurs in Peel County. The following is a description of a Gilford loam profile.

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–6 inches loam; very dark brown (10 YR 2/2); fine granular structure; friable consistency; few stones; pH — 7.0.

G — 6–19 inches loam; dark greyish brown (10 YR 4/2); mottled; medium nuciform structure; friable consistency; stony; pH — 7.2.

C — Gravelly outwash; brown (10 YR 5/3); single grain structure; loose consistency; calcareous; pH — 7.6.

The topography is smooth very gently sloping and the drainage is poor. The natural vegetation consists mainly of elm, ash, and cedar.

Agriculture

Gilford loam is used for pastures and woodlots. Poor drainage and low fertility limit crop production. However, when drainage is improved and fertility levels are maintained fair yields of cereal grains, hay, and pasture can be obtained.

The organic matter content is high but phosphorus and potassium levels are low.

I. SOILS DEVELOPED ON SANDS UNDERLAIN BY CLAY TILL

Soils developed on sands underlain by clay till occupy only a small portion of Peel County. The sandy materials on the surface are similar to those of the Brighton catena, while the clay till resembles that of the Chinguacousy

catena. The depth of sand is variable ranging from a veneer a few inches thick up to three feet. Two series were mapped, the Bookton occurring on well drained sites and the Berrien on the imperfectly drained areas. Where the sand deposit is a foot or more in depth a profile has developed which exhibits Grey-Brown Podzolic characteristics.

(a) Good Drainage

Bookton Sandy Loam (1,600 acres)

Bookton sandy loam is a well drained soil with smooth gently sloping to smooth moderately sloping topography. A wide range of profiles occurs within the series depending on the depth of sandy overburden. The average profile exhibits the following characteristics.

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–3 inches sandy loam; dark greyish brown (10 YR 4/2); fine crumb structure; very friable consistency; stonefree; pH — 6.6.

A_2 — 3–8 inches sand; yellowish brown (10 YR 5/6); single grain structure; loose consistency; stonefree; pH — 6.6.

B_2 — 8–16 inches sand; dark brown (10 YR 4/3); single grain structure; loose consistency; stonefree; pH — 6.8.

B_3 — 16–22 inches sand; brown (10 YR 5/3); single grain structure; loose consistency; stonefree; pH — 7.0.

C — 22–30 inches sand; greyish brown (10 YR 5/2); single grain structure; loose consistency; calcareous; pH — 7.6.

D — Clay till; brown (10 YR 5/3); prismatic structure; hard consistency; calcareous; pH — 7.6.

Although there is a wide variation in the depth of sandy overburden the heavy clay till usually occurs at depths of about 30 inches.

The natural vegetation found in the woodlots consists mainly of hard maple, beech, and spruce.

Agriculture

Bookton sandy loam in Peel County is used for dairying and general farming. The sandy loam is low in phosphorus and potassium, but the underlying clay till is better supplied with these elements. The type is fairly well suited to the production of cereal grains, hay and pasture. Vegetables, tree fruits and small fruits should do well where the climatic environment is satisfactory.

Fertility and organic matter maintenance are the main requirements for successful farming on this soil. Satisfactory nutrient and structural condition

can be maintained by soil management practices commonly associated with successful dairy farming operations.

(b) *Imperfectly Drained*

Berrien Sandy Loam (800 acres)

Berrien sandy loam is the imperfectly drained member of the Bookton catena and exhibits the characteristics of the Grey-Brown Podzolic Great Soil Group. The topography is smooth gently sloping. The profile description is as follows:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–5 inches sandy loam; dark greyish brown (10 YR 4/2); fine crumb structure; very friable consistency; stonefree; pH — 6.8.

A_2 — 5–9 inches sand; pale brown (10 YR 6/3); mottled; single grain structure; loose consistency; stonefree; pH — 6.6.

B_2 — 9–19 inches sand; dark brown (10 YR 4/3); mottled; single grain structure; loose consistency; stonefree; pH — 7.2.

B_3 — 19–29 inches sand; yellowish brown (10 YR 5/6); single grain structure; loose consistency; stonefree; pH — 7.2.

C — 29–32 inches sand and gravel; greyish brown (10 YR 5/2); single grain structure; loose consistency; calcareous; pH — 7.6.

D — Clay till; brown (10 YR 5/3); prismatic structure; hard consistency; calcareous; pH — 7.6.

The clay till usually appears at depths of three feet and less. Although an arbitrary depth of 3 feet or less of sandy overburden has been established for the Berrien series occasionally the sand deposits are very variable. In places the clay may come to the surface between sandy swells.

The natural drainage is imperfect, the runoff being low and the permeability slow. The natural vegetation consists mainly of soft maple, elm, and ash. Coniferous species such as hemlock, cedar, and spruce may also occur.

Agriculture

The Berrien sandy loam mapped in Peel County occurs in the cash crop district in the southern part of the County and is used for the production of tree fruits, small fruits and vegetables. The chief limitations to successful crop production are low fertility and inadequate drainage. High fertility levels are required for cash crops and they should be maintained by additions of mineral fertilizer and barnyard manure.

J. SOILS DEVELOPED ON LACUSTRINE CLAYS UNDERLAIN BY CLAY TILL

The parent material of this group of soils was deposited by still water as a thin veneer over the underlying clay till. It is possible the lacustrine materials owe their origin to the waters of glacial Lake Peel. Free carbonates commonly occur in both the lacustrine and till materials.

The Cashel catena has developed on the high lime lacustrine clays underlain by fine textured clay till. Three members of the catena were recognized and mapped in the County, they are: the well drained Cashel series, the imperfectly drained Peel series, and the poorly drained Malton series.

(a) *Good Drainage*

Cashel Clay (500 acres)

The Cashel clay occurs in small areas in the townships of Toronto and Toronto Gore. Smooth moderately sloping topography and good drainage are characteristic of this type. The following profile description indicates its general characteristics.

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–5 inches clay; dark greyish brown (10 YR 4/2); medium granular structure; friable consistency; stonefree; pH — 6.6.

A_2 — 5–13 inches clay; yellowish brown (10 YR 5/4); fine nuciform structure; firm consistency; stonefree; pH — 6.6.

B_2 — 13–23 inches clay; dark brown (10 YR 4/3); medium nuciform structure; plastic consistency; stonefree; pH — 7.2.

C — 23–26 inches clay; greyish brown (10 YR 5/2); medium nuciform structure; plastic consistency; stonefree; calcareous; pH — 7.8.

D — Clay till; light greyish brown (10 YR 6/2); fragmental structure; hard consistency; gritty; few stones; calcareous; pH — 7.8.

The solum is stonefree but usually contains small bits of shale. The internal drainage is slow but there is sufficient fall towards the stream courses to permit adequate external drainage. The type has suffered from sheet erosion to some extent and gully erosion may require control measures particularly along stream courses. The tree cover appears to have been dominated by oak, hard maple and pine.

Agriculture

Cashel clay is used for dairying and general farming. It is well suited to the production of cereal grains, legumes, hay, and pasture. Susceptibility to erosion is the chief limitation to crop production. Soil loss can be lessened by the use of forage crops in a long rotation.

The organic matter content is medium to high but should be maintained by additions of manure. Organic matter is necessary, particularly in clay soils,

to keep a satisfactory soil structure. Chemical tests show the Cashel clay to be fairly well supplied with plant nutrients.

(b) Imperfectly Drained

Peel Clay (33,900 acres)

Peel clay is the imperfectly drained member of the Cashel catena and occupies a large section of Toronto, Chinguacousy and Toronto Gore Townships. Formed from stonefree lacustrine materials, the Peel clay is a neutral to slightly acid soil with clay till appearing at depths of three feet or less. The Peel exhibits the characteristics of the Grey-Brown Podzolic Great Soil Group.

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–6 inches clay; dark greyish brown (10 YR 4/2); medium granular structure; friable consistency; stonefree; pH — 6.8.

A_2 — 6–8 inches clay; light yellowish brown (10 YR 6/4); slightly mottled; medium nuciform structure; firm consistency; stonefree; pH — 6.5.

B_2 — 8–18 inches clay; dark brown (10 YR 4/3); mottled; coarse nuciform structure; plastic consistency; stonefree; pH — 7.0.

C — 18–20 inches clay; greyish brown (10 YR 5/2); medium nuciform structure; plastic consistency; stonefree; calcareous; pH — 7.8.

D — Clay till; light greyish brown (10 YR 6/2); fragmental structure; hard consistency; gritty; few stones; calcareous; pH — 7.8.

The internal drainage is low and the runoff is slow except where the slope is sufficient to provide a somewhat more rapid external drainage. The topography is smooth gently sloping and erosion is slight.

The surface soil is fairly high in organic matter and plant nutrients. The type responds to tile drainage, especially where basin-like depressions occur between the swells in the topography. However, these depressions make the installation of tile drains difficult. The natural vegetation in existing woodlots is dominantly soft maple and elm.

Agriculture

The soil is well suited to the production of cereal grains, hay, and pasture. Alfalfa yields are fairly good except where drainage is inadequate. The Peel clay is adapted to dairy farming which is the most common agricultural endeavour found on it. The type is also adapted to the growth of such crops as corn, flax and other cash crops of this kind.

The organic matter is well incorporated with the mineral portion of the soil. Productivity can be fairly well maintained through the use of good farm practices.

(c) Poor Drainage

Malton Clay (5,000 acres)

Malton clay is the poorly drained member of the Cashel catena. Developed on materials similar to those of the Peel series, it occurs on smooth very gently

Peel clay is imperfectly drained and is stone-free. The clay till occurs at depths of three feet or less.

sloping topography, and is poorly drained. The horizons of the profile are poorly defined as indicated by the following description.

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–7 inches clay; very dark greyish brown (10 YR 3/2); medium granular structure; friable consistency; stonefree; pH — 7.0.

G_1 — 7–11 inches clay; dark greyish brown (10 YR 4/2); mottled; medium blocky structure; plastic consistency; stonefree; pH — 7.0.

G_2 — 11–22 inches clay; dark greyish brown (10 YR 4/2); intensely mottled; coarse blocky structure; plastic consistency; stonefree; pH — 7.2.

C — 22–27 inches clay; greyish brown (10 YR 5/2); mottled; medium nuciform structure; plastic consistency; stonefree; calcareous; pH — 7.8.

D — Clay till; light brownish grey (10 YR 6/2); mottled; fragmental structure; hard consistency; calcareous; few stones; pH — 7.8.

The tree cover of the Malton consisted largely of elm, ash, cedar and a few soft maples. Chemical tests show the type to be fairly well supplied with most plant nutrients, the chief limitation for crop production being the poor drainage conditions.

Agriculture

General farming and dairying are the most common agricultural endeavours found on the Malton clay. Poor drainage practically prohibits the growing of alfalfa. Provided weather conditions permit reasonably early planting, fairly good yields of cereal grains are obtained. The type is well suited to the production of hay and pasture.

K. SHALLOW SOILS OVER BEDROCK

Approximately 5 per cent of the soils of Peel County have a shallow mantle of soil underlain by shale or limestone bedrock. A large proportion of the area has a covering of soil of less than two feet over the bedrock. Where these soils are well drained the covering is approximately three feet in depth.

Six soil series were mapped, separations being made according to the composition of the underlying bedrock and drainage.

1. Soils Formed Over Grey Shale

Shallow soils formed over the grey shale of the Dundas formation were included in the Brockport catena. The well drained Brockport series, the imperfectly drained Cooksville series, and the poorly drained Missisauga series are members of the Brockport catena.

(a) Good Drainage

Brockport Clay Loam (700 acres)

Brockport clay loam is a well drained soil exhibiting the characteristics of the Grey-Brown Podzolic Great Soil Group. In all areas the soil mantle is deep enough so that a soil profile can form which has the following profile characteristics:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–5 inches clay loam; very dark grey (10 YR 3/1); medium granular structure; friable consistency; few stones; pH — 5.5.

A_2 — 5–11 inches clay loam; yellowish brown (10 YR 5/4); medium nuciform structure; friable consistency; few stones; pH — 5.3.

B_2 — 11–25 inches clay; greyish brown (10 YR 5/2); medium blocky structure; plastic consistency; very stony; pH — 5.5.

D — Shale bedrock; grey (10 YR 5/1); calcareous; pH — 6.8.

Shale fragments occur throughout the profile. The solum rests on the bedrock, with no evidence of a C horizon. The topography is smooth gently sloping and sheet eroision is moderate. Permeability is low because of the presence of the bedrock but the moderate slopes permit rapid runoff thereby providing adequate drainage. Oak, hard maple and pine are the species most commonly occurring in the woodlots.

The type is low in organic matter, nitrogen, phosphorus, and calcium, but is fairly well supplied with potassium.

Agriculture

Crop production is limited because of shallowness of the soil and droughtiness. However, fair yields of cereal grains, hay and pasture can be obtained. The type is most commonly used for general farming.

Additions of mineral fertilizer and barnyard manure are required if the soil is to be maintained for good crop growth. Liming is necessary for production of most crops.

(b) Imperfect Drainage

Cooksville Clay Loam (5,100 acres)

Cooksville clay loam occurs in the southern part of Toronto Township and is characterized by the presence of grey shale bedrock at depths of 2 feet and less. It is the imperfectly drained member of the Brockport catena and exhibits the characteristics of the Grey-Brown Podzolic Great Soil Group. There is usually sufficient soil over the bedrock for profile formation as illustrated by the following generalized profile description.

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–5 inches clay loam; very dark grey (10 YR 3/1); medium granular structure; friable consistency; few stones; pH — 5.2.

A_2 — 5–9 inches clay loam; yellowish brown (10 YR 5/6); medium nuciform structure; friable consistency; few stones; pH — 5.0.

B_2 — 9–19 inches clay; greyish brown (10 YR 5/2); mottled; blocky structure; plastic consistency; very stony; pH — 5.5.

D — Shale bedrock; grey (10 YR 5/1); calcareous; pH — 6.8.

Large shale fragments frequently reach the surface to hinder cultivation and cause a droughty profile. Soft maple, elm and a few cedar are the tree species most commonly occurring in the woodlots. The topography is smooth gently sloping.

Agriculture

Cooksville clay loam is best used for grazing or forestry. Crop production is limited by low fertility, shallowness and droughtiness. Some general farming and dairying is practised and fair yields of cereal grains, hay and pasture can be obtained when fertility levels are increased and maintained.

The type is low in organic matter, phosphorus, potassium, nitrogen, and calcium. Additions of mineral fertilizer, manure and lime are necessary if satisfactory crop yields are to be obtained.

The bedrock materials are often used in the manufacture of building materials.

(c) *Poorly Drained*

Missisauga Clay Loam (600 acres)

Occurring in the southern part of Toronto Township, Missisauga clay loam is characterized by a shallow mantle of soil over grey shale bedrock. The profile exhibits the characteristics of the Dark Grey Gleisolic Great Soil Group.

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–6 inches clay loam; black (10 YR 2/1); medium granular structure; friable consistency; few stones; pH — 6.0.

G — 6–15 inches clay loam; greyish brown (10 YR 5/2); very mottled; massive structure; plastic consistency; stony; pH — 6.2.

D — Shale bedrock; grey (10 YR 5/1); calcareous; pH — 6.8.

The drainage of the Missisauga clay loam is poor, the external drainage being very low and the internal drainage being very slow. Shale fragments and stones often reach the surface and hinder cultivation.

Most of the soil is in woodlots, the dominant tree species being ash, elm, and cedar. The type has a medium organic matter content and is medium in plant nutrient levels.

Agriculture

Poor drainage and stoniness limit crop production on the Missisauga clay loam. It is best used for forestry and grazing purposes. The use of tile drains is impracticable because of the presence of bedrock at such shallow depths.

2. Soils Formed Over Red Shale

The Lockport catena contains the shallow soils formed over the red shale of the Queenston formation. Two series, the well drained Lockport and the imperfectly drained Trafalgar, were recognized and mapped in Peel County.

A profile of Mississauga clay loam. The bedrock appears at the surface in this location.

(a) *Good Drainage*

Lockport Clay (1,500 acres)

Lockport clay is characterized by smooth steeply sloping topography and severely eroded slopes. It occurs in Chinguacousy Township between Terra Cotta and Inglewood and exhibits the characteristics of the Grey-Brown Podzolic Great Soil Group. The profile characteristics are given in the following description.

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–4 inches clay; brown (7.5 YR 4/2); medium granular structure; friable consistency; stonefree; pH — 5.5.

A_2 — 4–12 inches clay; yellowish brown (10 YR 5/8); medium nuciform structure; friable consistency; stonefree; pH — 5.6.

B_2 — 12–26 inches clay; reddish brown (5 YR 4/3); medium blocky structure; plastic consistency; stonefree; pH — 6.0.

C — 26–28 inches clay; dark red (2.5 YR 3/6); fragmental structure; hard consistency; calcareous; pH — 7.4.

D — Shale bedrock; dark red (2.5 YR 3/6); calcareous; pH — 7.4.

The permeability of the Lockport clay is low but the steep slopes permit rapid runoff which provides a well drained profile. The type is severely eroded and a permanent cover of grass or trees should be grown to prevent further soil loss.

The natural vegetation consists mainly of oak, hard maple and a few pine. The type is low in organic matter, phosphorus, potassium and calcium.

Agriculture

Various factors make this a poor soil for most agricultural endeavours. Cash crops cannot be grown because of erodibility. General farm crops cannot be economically grown due to the high cost of the fertilizer required to increase and maintain the fertility level. Low fertility, susceptibility to erosion, shallowness and droughtiness are factors which limit crop production on the Lockport clay.

Possibly the soil is best used for reforestation or grazing purposes. The soil can be used as pasture only where a permanent grass cover can be established.

(b) *Imperfect Drainage*

Trafalgar Clay (1,100 acres)

Found in the southwestern part of Toronto Township, Trafalgar clay occupies a smaller area of Peel County than its well drained associate Lockport clay. It occurs on smooth, gently sloping areas and has not suffered greatly from erosion. The type developed under a tree growth consisting largely of soft maple and elm. The following is a description of a virgin profile located in Toronto Township.

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–5 inches clay; brown (7.5 YR 4/2); medium granular structure; friable consistency; stonefree; pH — 5.8.

A_2 — 5–10 inches clay; yellowish brown (10 YR 5/8); mottled; medium nuciform structure; friable consistency; stonefree; pH — 5.6.

B_2 — 10–22 inches clay; reddish brown (5 YR 4/3); medium blocky structure; plastic consistency; stonefree; pH — 6.2.

C — 22–23 inches clay; dark red (2.5 YR 3/6); fragmental structure; hard consistency; calcareous; pH — 7.4.

D — Shale bedrock; dark red (2.5 YR 3/6); calcareous; pH — 7.4.

The bedrock appears at depths of three feet and less and permits a droughty condition in the soil. The soil is low in organic matter, calcium, phosphorus, and potassium.

Agriculture

Trafalgar clay is used chiefly for general farming and dairying. Fairly good yields of cereal grains, hay and pasture can be obtained and some cash crops could be grown to advantage. The chief limitations to crop production are low fertility, inadequate drainage, and shallowness.

Fertility can be increased and maintained by additions of mineral fertilizer and manure. The addition of lime to correct the acidity would improve soil conditions for the production of most crops. Although tile drainage would increase the soil adaptability, tiles would be difficult to install due to the nearness of the underlying bedrock.

3. Soils Formed Over Limestone

Only a small area in Chinguacousy and Caledon Townships has less than one foot of soil overlying Lockport dolomitic limestone. Although the topography is chiefly smooth gently sloping, areas occur where steep slopes are present. Of the shallow soils over limestone bedrock, the Farmington loam is the only soil type recognized and mapped in Peel County.

(a) Good Drainage

Farmington Loam (4,000 acres)

The Farmington supports a tree cover of sugar maple and white cedar and a few beech. There is less than a foot of soil over the bedrock and little differentiation in colour or texture within the weathered portion of the profile. The surface soil is usually a loam and a dark brown colour dominates the whole profile to the bedrock. Free carbonates are commonly found on the surface soil.

Forestry and grazing are the chief endeavours found on the Farmington. Provided a farmer has sufficient acreage, fairly effective grazing can be obtained for at least part of the season. During the spring season and again after fall rains the type provides fair pasture. However, during the summer months it drys out badly and the carrying capacity for livestock is considerably reduced.

Crop production is almost prohibited by the droughty condition and shallowness of the soils. Forage crop improvement is difficult because of the physical limitations, which lessen the effectiveness of soil amendments. Improved land use on the Farmington will have to be based on a minimum of capital expenditure because of the low market value of the land.

L. ORGANIC SOILS

The organic soils are most commonly found in the northern part of Peel County. They are developed on the accumulation of organic materials and are referred to in the literature as Bog soils.

Muck (4,500 acres)

Muck soils are made up of well decomposed organic materials and are very dark in colour. The profile of a muck soil usually does not exhibit the characteristic layering of the mineral soils. The following description of a muck soil indicates the arrangement of the layers.

1/ Surface: black (10 YR 2/1); well decomposed organic materials derived from sedges, leaves and other readily decomposed material; variable depth; neutral reaction.

2/ less well decomposed woody materials.

3/ sticky; dark in colour; well decomposed.

4/ clay, sand, marl or bedrock.

Muck usually occurs on depressional topography. The drainage is very poor and often muck land is under water for part of the season. The vegetation consists mainly of elm, ash, white cedar and sedges, the latter being the dominant herbaceous plant. The reaction ranges from neutral to slightly alkaline.

Agriculture

There has been very little development of the muck soils in the County. In York County some areas are highly developed and are being used for market gardening. To develop the organic soils of Peel County it is first necessary to improve the drainage which is costly and difficult. If muck is to be used for market gardening purposes, better crops are produced when it is irrigated. However, most muck areas occur in districts where it is difficult to procure water for irrigation purposes. In Peel County it is used chiefly for tree growth. It could be used as a source of organic material for soils that are low in organic matter.

M. MISCELLANEOUS SOILS

Bottom Land (25,800 acres)

The low lying soils along stream courses which are subject to flooding are mapped as Bottom Land. Bottom Land is an immature soil and shows little horizon differentiation. The profile usually consists of a deep dark coloured surface underlain by greyish material. The drainage varies but is usually poor. Vegetation consists of willow, elm and cedar. Bulrushes, sedges, and marsh grasses occur where the land is flooded for most of the season.

Bottom Land is used largely for pasture but in some locations, where large areas exist, it can be cultivated and used for general farm crops. Before general farm crops can be grown successfully the time and extent of flooding must be considered.

PART IV

AGRICULTURE AND LAND USE

Early Settlement and Agricultural Development

Early settlement of Peel County was made possible by the travelling facilities afforded by Lake Ontario and the Credit River. The first settlers entered Toronto Township in 1808, and the four remaining Townships of Caledon, Chinguacousy, Albion and Toronto Gore were entered in 1819 according to the Report of the Agricultural Commission of 1881. The County was wholly settled in a little over twenty-five years.

While the land was being cleared, farm endeavour consisted of a combination of lumbering and agriculture. Sufficient food for livestock and the family was produced during the summer months, the winter months being used for lumbering.

Mixed farming was the most important agricultural pursuit. However, with the growth of Toronto and the subsequent increase in population the dairy industry developed rapidly to supply this important market with milk and milk products. The Report of the Agricultural Commission of 1881 indicates that there were four cheese factories, sixteen flour mills, a woollen mill and two foundry and machine shops in the County at that time.

Very little drainage improvement was practised in early days only 500 acres being tile drained by 1881. Many of the farmers recognized the importance of maintaining soil fertility. Salt was applied to grain crops and plaster was used on clover, corn, and meadow land as soil amendments.

Dairying is an important agricultural endeavour in Peel County.

Present Agriculture

The agriculture of Peel County has developed over the years and now consists chiefly of mixed farming, livestock farming, dairying and fruit growing. The present status of land use in the County is indicated in Table 7.

TABLE 7

PRESENT LAND USE (1941 CENSUS)

	Acres	% of total
Total land area	300,160	100%
Area occupied land	274,225	91.3%
Area improved land	224,594	72.8%
Area unimproved land	49,631	13.2%

Over 91 per cent of the total land area is occupied land. The remainder is made up of road allowances, stream courses, etc. The improved land is that which has increased in value through the efforts of the owner. Table 8 shows the acreages of the various crops, etc., that go to make up the improved land.

TABLE 8

PRESENT USE OF IMPROVED LAND

	Acres	% of Total
Field crops	141,478	63.0
Pasture	57,310	25.6
Fallow	10,182	4.6
Orchard and vineyard	4,205	1.9
Market garden	1,953	0.8
Small fruits and nursery	632	0.2
Other	8,834	3.9
Area of improved land	224,594	100.0

The unimproved land comprises slightly over 13 per cent of the occupied area and is made up of natural pasture, woodland and marsh. Most of the shallow soils over bedrock have been left in natural pasture or woodland. The marsh areas are most commonly found in the northern part of the County where depressional areas have permitted the accumulation of water and organic materials. Much of the poorly drained bottom land adjoining the stream courses remains in pasture land or woodland.

The acreages of the various unimproved lands are shown in Table 9.

TABLE 9

PRESENT USE OF UNIMPROVED LAND

	Acres	% of Total
Natural pasture	22,327	45.0
Woodland	21,612	43.5
Marsh	5,692	11.5
Total	49,631	100.0

Further field crop data is presented in the Annual Report of the Statistics Branch (1948), Ontario Department of Agriculture. Table 10 shows the field crops commonly grown in the County and their acreages. The total acreage of field crops (157,460) differs slightly from that of the 1941 Census (141,478) because the records apply to two different years. A glance at Table 10 shows the predominance of hay and clover, mixed grains, oats, fall wheat, alfalfa and corn grown in Peel County. Large acreages of these crops contribute to the establishment of successful dairy farms.

TABLE 10

ACREAGE OF FIELD CROPS IN PEEL COUNTY

(Annual Report of Statistics Branch, 1948, Ontario Department of Agriculture)

	Acres	
Hay and Clover	46,900	
Alfalfa	16,900	63,800
Mixed Grain	33,700	
Oats	27,100	
Fall Wheat	21,100	
Barley	2,200	
Rye	1,660	
Buckwheat	820	
Spring Wheat	570	87,150
Corn (fodder)	3,690	
Potatoes	1,930	
Flax	270	
Mangels	260	
Turnips	150	
Corn (husking)	110	
Soybeans	50	
Peas	30	
Beans	20	6,510
Total Field Crops		157,460
Seeded Pasture		56,400

Small fruits and tree fruits are grown in the southern part of the County where the climatic environment is suitable due to the moderating effect of Lake Ontario. The acreages of the tree fruits and small fruits commonly grown in the area are shown in Table 11.

TABLE 11

ACREAGE OF TREE FRUITS AND SMALL FRUITS IN PEEL COUNTY (1941 CENSUS)

Tree Fruits	Acres	
Apples	3,162	
Pears	382	
Cherries	272	
Plums	166	
Peaches	88	3,970
Small Fruits		
Grapes	521	
Strawberries	263	
Raspberries	218	1,002
Total		4,972

The following table taken from the 1941 Census gives a generalized picture of the types of farms most commonly occurring in Peel County.

TABLE 12

TYPES OF FARM OCCURRING IN PEEL COUNTY (1940)

Type of Farm	Number
Mixed farming	564
Livestock	510
Dairy products	481
Vegetables, fruits and nursery products	376
Subsistence and combination of subsistence	270
Poultry	103
Part-time	95
Grains and hay	72
Forest and apiary products	13
Potatoes, roots and field crops	9

Many of the cash crops are grown in the southern part of the County along the Lake Ontario shore where a moderate climate permits the growth of tender fruits and early vegetables. Potatoes are grown, to some extent, in the sandy areas of Caledon and Albion Townships. Dairying is most common in the central part of the County, mixed and livestock farming occurring chiefly in Caledon and Albion Townships.

Mixed farms are farms where the revenue from two or more of the other main types of products are required to produce 50 per cent or more of the gross revenue. Farms on which the value of the products used by the farm household amounted to 50 per cent or more of the gross farm revenue are classed as subsistence farms. Combinations of subsistence farms are farms where the value of the products used and the revenue from another main type, such as poultry, livestock, etc., were required to form 50 per cent or more of the gross farm revenue.

The Use and Management of Peel County Soils

The use of the different soils on a farm is determined by a number of factors — physical, economic, and social. As the use of land is determined in part by economic and social factors, in many places such use cannot be brought into full accord with the physical limitations of the soil. Nevertheless, one of the aims in the operation of a farm is to adjust the use of the soils as nearly as practicable to their physical limitations. After the farmer has assigned suitable uses to his land the matter of management of each soil logically follows. The term "soil management," as used here, refers to such practices as (1) choice and rotation of crops, (2) application of amendments, (3) tillage practices and (4) control of water on the farm.

For purposes of discussion, the soils of Peel County have been grouped on a textural basis. The sands and sandy loams have been placed in the "coarse textured" group, the loams and silt loams in the "medium textured" group, and the clays and clay loams with the "fine textured" soils. The distribution of the textural classes is shown in Figure 7. The shallow soils are discussed under the heading of shallow soils over bedrock and muck under organic soils.

SURFACE TEXTURE

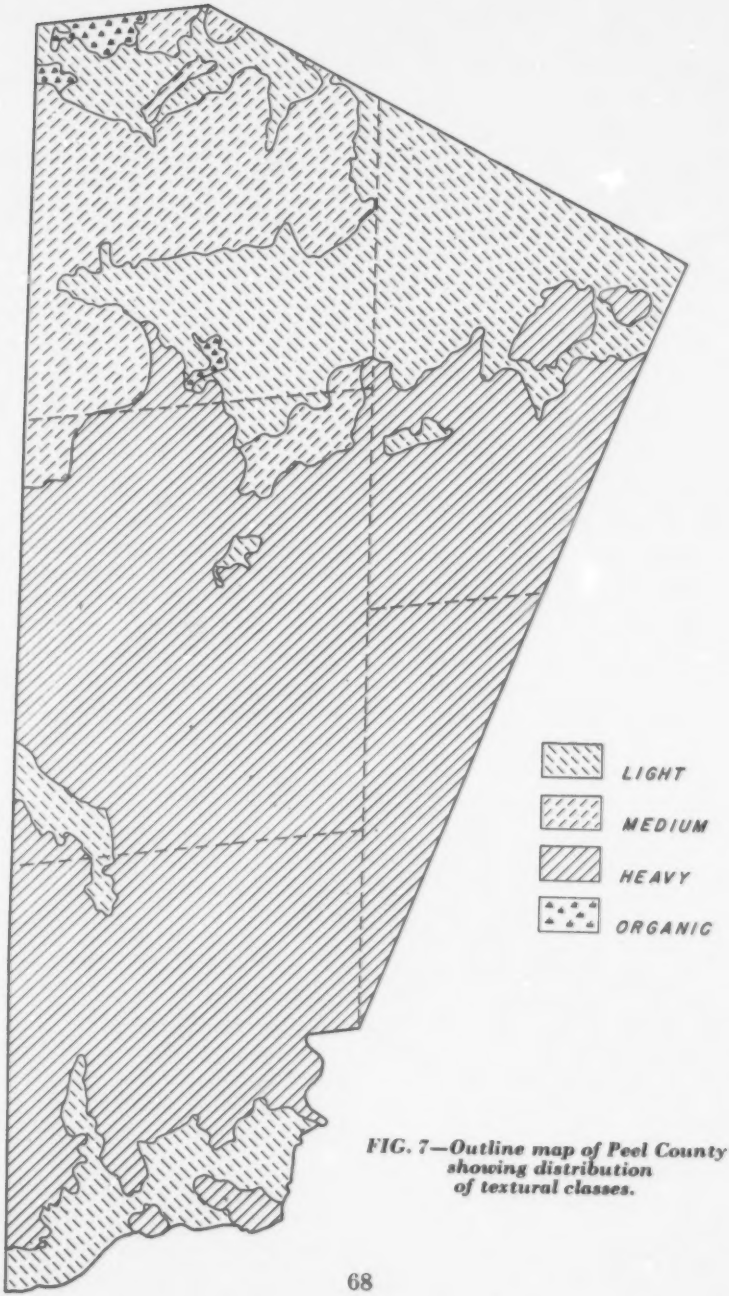


FIG. 7—Outline map of Peel County showing distribution of textural classes.

COARSE TEXTURED SOILS

(a) *Well Drained*

Soil Type	Acreage	% of Total
Dumfries sandy loam	2,400	0.8
Pontypool sandy loam	46,300	15.4
Fox sandy loam	6,700	2.2
Fox sand	6,900	2.3
Brighton sandy loam	3,300	1.1
Bookton sandy loam	1,000	0.3
Total	66,600	22.1

As pointed out in Part III the components of this group vary chiefly in the nature of the underlying material and in topography. They have a low moisture retaining quality and tend to be droughty in a normal season. Because of their porous nature the soluble salts are readily leached. However, the rapid percolation of moisture results in a well drained condition and permits early spring cultivation. Crop production on these soils is influenced by moisture relationships and low fertility levels.

Dumfries sandy loam is a stony soil occurring on irregular steeply sloping topography. Crop production is limited by low fertility, stoniness and susceptibility to erosion. The soil is fairly well suited to the production of cereal grains, hay and pasture. It should be kept under a vegetative cover for as great a proportion of time as possible so that the loss of soil by erosion is reduced. Plant nutrient and organic matter levels should be increased and maintained if good crop yields are to be obtained.

The Pontypool sandy loam occurs on irregular moderately sloping to irregular steeply sloping topography. The soil is quite susceptible to wind erosion and has suffered from erosion particularly where the slopes are steep. Some areas are suited to the production of most farm crops provided satisfactory fertility and organic matter levels are maintained. Steeply sloping areas might well be returned to tree cover to prevent soil loss.

The topography of the Fox sandy loam, and Brighton sandy loam is smooth moderately sloping. When fertility levels and organic matter content are increased and maintained the soils are well suited to the production of cash crops. Tree fruits do well except where production is retarded by unsatisfactory climate. Areas that are susceptible to and have suffered from wind erosion should be kept under a vegetative cover for as large a proportion of time as possible.

Clay occurs at depths of three feet and less in the Bookton sandy loam which increases its capability for growing crops. The underlying clay is better supplied with plant nutrients than the coarse textured overburden. The Bookton mapped in Peel County occurs near the Lake Ontario shore where climatic environment is satisfactory for the growing of tree fruits and vegetable crops.

(b) *Imperfect Drainage*

Soil Type	Acreage	% of Total
Brady sandy loam	1,300	0.4
Berrien sandy loam	800	0.3
Total	2,100	0.7

Brady sandy loam and Berrien sandy loam are the only coarse textured imperfectly drained soils mapped in Peel County. Organic matter and fertility maintenance are the main requirements contributing to successful land use on these soils. The clay layer which appears at depths of three feet and less in the Berrien series apparently is an asset for the production of most farm crops. The Berrien and Brady soils can grow a fairly wide range of crops particularly when fertility levels are maintained. Drainage improvement permits the growth of a wider range of crops. The soils are fairly well suited to the production of cereal grains, pasture, tree fruits and vegetables.

MEDIUM TEXTURED SOILS

(a) *Well Drained*

Soil Type	Acreage	% of Total
Dumfries loam	8,200	2.7
Harriston loam	10,400	3.5
Woburn loam	3,800	1.3
Caledon loam	10,200	3.4
Total	32,600	10.9

Dumfries loam has similar land use and management problems to those of the Dumfries sandy loam described under the light textured soils. It has a somewhat higher level of natural fertility than the Dumfries sandy loam and is not as subject to droughtiness.

With satisfactory rotations and good soil management Harriston loam and Woburn loam produce good yields of most farm crops. Occurring on smooth moderately sloping topography they are susceptible to sheet erosion but this hazard can be adequately controlled through the use of relatively simple erosion control measures. These soils are medium to low in potassium and low to very low in phosphorus. Good soil management practices will provide more organic matter and maintain fertility levels.

The Caledon loam differs from the other components of this group in that it is formed from well sorted gravelly outwash rather than till. The soil is low in nitrogen, phosphorus, potassium, calcium, and organic matter. Caledon loam responds to applications of fertilizer and barnyard manure. Liming is usually necessary particularly if alfalfa is to be grown successfully. The soil is suited to the production of most farm crops provided organic matter content and fertility levels are increased and maintained. Soil loss occurring on the moderately sloping topography can be prevented by simple erosion control methods.

(b) *Imperfect Drainage*

Soil Type	Acreage	% of Total
Listowel loam	1,100	0.4
Milliken loam	2,200	0.7
Total	3,300	1.1

Caledon soils on gently to moderately sloping topography are used for general farming.

The imperfectly drained medium textured soils occupy 1.1 per cent of the County area. The imperfect drainage narrows the range of crops that can be grown. Effective tile drainage can be installed which greatly increases their usability and reliability. Chemical tests show that these soils are moderately well supplied with organic matter, calcium and potassium, while the phosphorus content is low.

(c) *Poorly Drained*

Soil Type	Acreage	% of Total
Lily loam	300	0.1
Parkhill loam	2,200	0.7
Lyons loam	200	0.06
Gilford loam	1,100	0.4
Total	3,800	1.26

Usually the poorly drained medium textured soils do not occur as large expanses but are found in small areas in association with the imperfectly and well drained soils. Poor drainage is the chief limiting factor to crop production on these soils. Once drainage improvement is effected care must be taken to maintain organic matter content and fertility levels. The lack of surface drainage and the depressional to very gently sloping topography causes water to lie on these soils late in the spring and often cultivation is delayed beyond the time when crops can be planted. The soils in this group are used extensively for pasture and woodlots. Fair yields of general farm crops are obtained when drainage is improved.

FINE TEXTURED SOILS

(a) *Well Drained*

Soil Type	Acreage	% of Total
King clay loam	13,200	4.4
Oneida clay loam	20,500	6.8
Cashel clay	500	0.2
Total	34,200	1.14

Occurring on smooth moderately sloping topography the soils of this group are quite susceptible to erosion. The degree to which these soils have been affected by erosion depends on past treatment and on length and degree of slope. Where short rotations have been practised and the soil left without cover during the fall and winter seasons there has been a considerable loss of valuable topsoil. Topsoil contains most of the active plant nutrients and organic matter and it should be conserved at all costs. Sheet erosion can be arrested by keeping a dense vegetative cover on the soil for as large a proportion of time as possible. The maintenance of adequate organic matter and fertility levels is essential for an effective erosion control program. The smooth regular slopes permit the use of such control measures as contour tillage and strip cropping to prevent erosion.

The King clay loam and Cashel clay are well suited to the production of most general farm crops. They are fairly well supplied with potassium, calcium and organic matter but are low in phosphorus. Oneida clay loam is somewhat lower in inherent fertility than the other members of this group. A low calcium content sometimes makes liming necessary before alfalfa can be grown successfully. Additions of mineral fertilizer are required to build up and maintain the low content of potassium and phosphorus.

(b) Imperfectly Drained

Soil Type	Acreage	% of Total
Monaghan clay loam	200	0.06
Chinguacousy clay loam	68,500	22.8
Peel clay	33,900	13.1
Total	102,600	35.96

These soils occupy approximately 36% of the total land area of Peel County. Inadequate drainage is the chief limitation to crop production. The use of tile drains provides for more rapid drainage permitting the production of a wider range of crops. Tile drains may prove difficult to install in areas where depressions occur in the smooth gently sloping topography.

The soils in this group are well suited to dairying, general farming and certain types of specialization. Cereal grains, hay and pasture produce good yields and canning crops, such as peas, beans, and corn do well. Inadequate drainage sometimes prevents the growth of alfalfa. The soils are fairly well supplied with potassium and organic matter, but are low in phosphorus. The Chinguacousy is low in calcium and liming may be necessary in some areas if good yields are to be obtained. When row crops are grown organic matter maintenance becomes very important since little of the crop residue is returned to the soil. The large dairying industry in the County should provide large amounts of manure for use on the soils so that the organic matter content can be maintained. Careful attention should be given to methods of handling manure so that there is as little loss as possible.

(c) Poorly Drained

Soil Type	Acreage	% of Total
Jeddo clay loam	5,600	1.9
Malton clay	5,000	1.7
Total	10,600	3.6

Artificial drainage greatly increases the use capability of these soils allowing a wider range of crops to be grown. The soils in this group are suited to general farming and large areas are kept in pasture where drainage is not improved. When drained these soils are adapted to the growth of cereal grains, hay, pasture and certain cash crops. Jeddo and Malton inherently have a fairly high natural fertility. When used for the growing of crops adequate organic matter content must be maintained if these soils are to be kept in a satisfactory physical condition. Due to undesirable physical condition the tile drainage is often not very effective. Good yields can be obtained from most farm crops if adequate drainage is provided and fertility levels are maintained.

Much of the Lockport clay in Peel County is severely eroded. Such areas require a permanent cover of trees or grass.

SHALLOW SOILS UNDERLAIN BY BEDROCK

(a) ***Well Drained***

Soil Type	Acreage	% of Total
Brockport clay loam	700	0.2
Lockport clay	1,500	0.5
Farmington loam	4,000	1.3
(b) ***Imperfectly Drained***		
Cookaville clay loam	5,100	1.7
Trafalgar clay	1,100	0.4
(c) ***Poorly Drained***		
Missisauga clay loam	600	0.2
Total	13,000	4.3

Slightly less than 5% of the soils of Peel County have a mantle of soil of less than three feet.

Crop production on the Brockport, Lockport, and Farmington is limited by low fertility, shallowness, stoniness, and droughtiness. Although Lockport clay is not stony it is highly erodible and should be kept under a vegetative

cover of trees or grasses. For the most part these soils are used for pasture or woodland and appear to be best suited for these uses. Pastures may dry out during the hot summer months.

Drainage of the imperfectly drained Cooksville and Trafalgar soils is impracticable because of the shallowness of the soils. These soils are most commonly used for pasture and woodlots although the lack of stones and the smooth gently sloping topography of the Trafalgar clay make it suited to the production of cereal grains and some cash crops. Fair yields of most crops can be obtained on the Trafalgar clay when low fertility levels are increased and maintained by additions of mineral fertilizer.

Crop production on the Missisauga clay loam is limited by poor drainage, low fertility, and stoniness. This soil is best used for pasture and woodlots.

All of the components of this group are limited by shallowness and low fertility and it would appear to be desirable that they be left as pasture or forest land.

ORGANIC SOILS

Soil Type	Acreage	% of Total
Muck	4,500	1.5

Only a very small proportion of the organic soils have been developed for agricultural purposes. Most of the muck is under trees.

Problem Areas

Areas occur in Peel County where there are definite problems or hazards affecting the use of the soil. These problems can be attributed to the effect of one or a combination of two or more of the following factors, low fertility, susceptibility to erosion, inadequate drainage and shallowness over bedrock. There are other areas in the County where the soils can be used without any serious problem developing provided good soil management practices are employed. The extent and distribution of the problem areas are shown in Figure 8.

Water Erosion and Fertility Maintenance

Loss of valuable topsoil through erosion is closely related to topography and texture of the land. Fertility is lowered materially with the loss of soil. Areas of moderate to severe, slight, and little or no erosion are indicated in Figure 9. Moderate to severe water erosion occurs on soils of loam to clay texture with moderately to steeply sloping topography. Where the slopes are more gentle or where the land is level susceptibility to erosion decreases.

In areas where erosion has taken its toll a great loss of plant nutrients and organic matter has occurred. Additions of mineral fertilizer and barnyard manure are required to make up for these losses. Maintenance of fertility levels will do much toward arresting soil erosion.

Drainage and Fertility Maintenance

Drainage improvement and fertility maintenance are problems on the imperfectly drained soils of the County. A wider range of crops can be grown and yields can be increased where tile drains are installed. Fertility levels

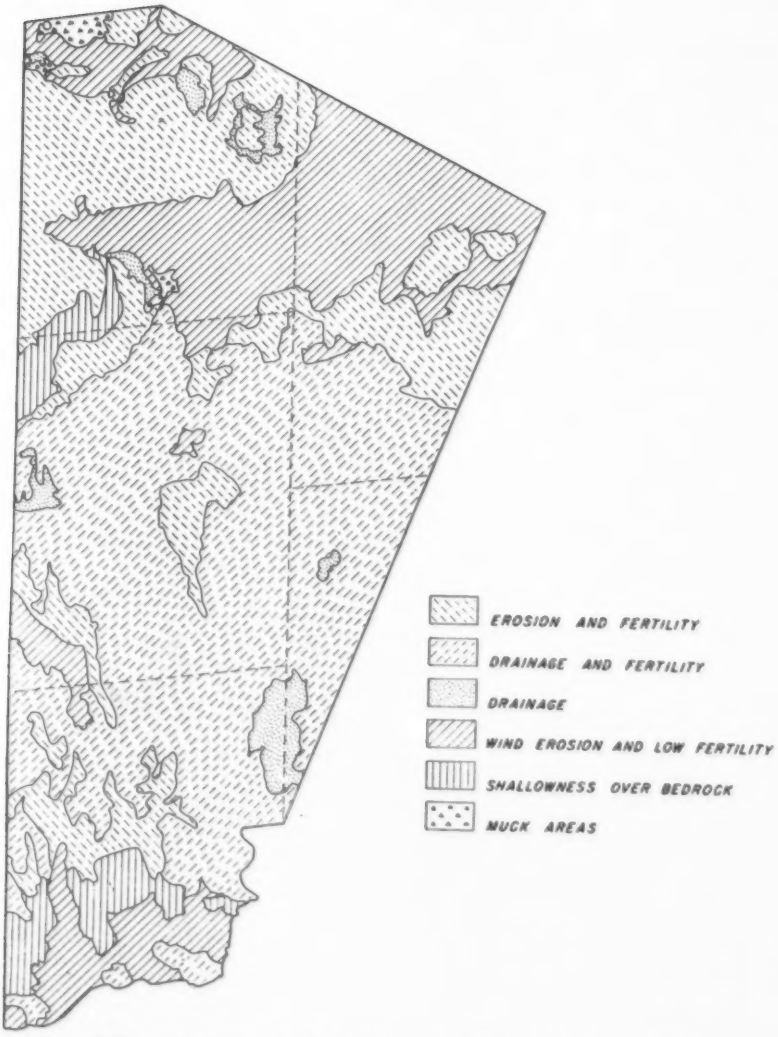


FIG. 8—Outline map of Peel County showing distribution of soil problem areas.

must be maintained by additions of mineral fertilizer and manure, particularly where drainage is improved.

Drainage

Areas of good, imperfect, poor, and very poor drainage are delineated in Figure 10. Soil drainage is dependent on the rate of water percolation through

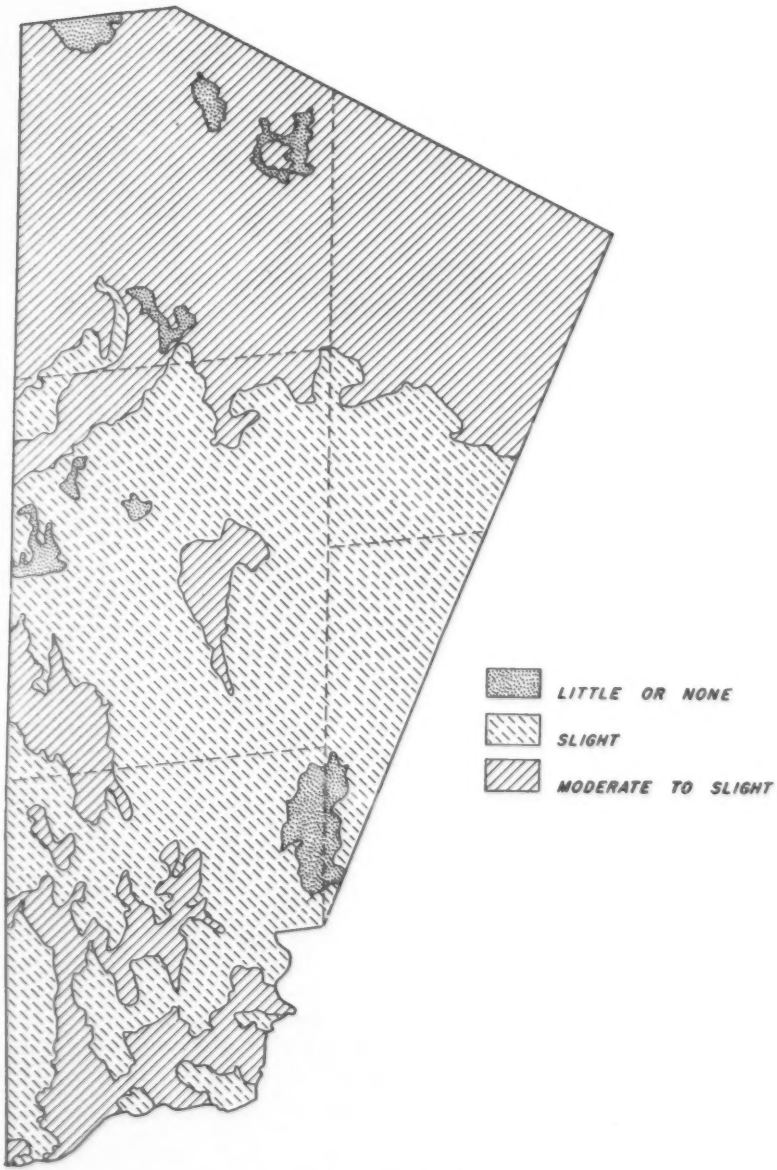


FIG. 9—Outline map of Peel County showing distribution of erosion classes.

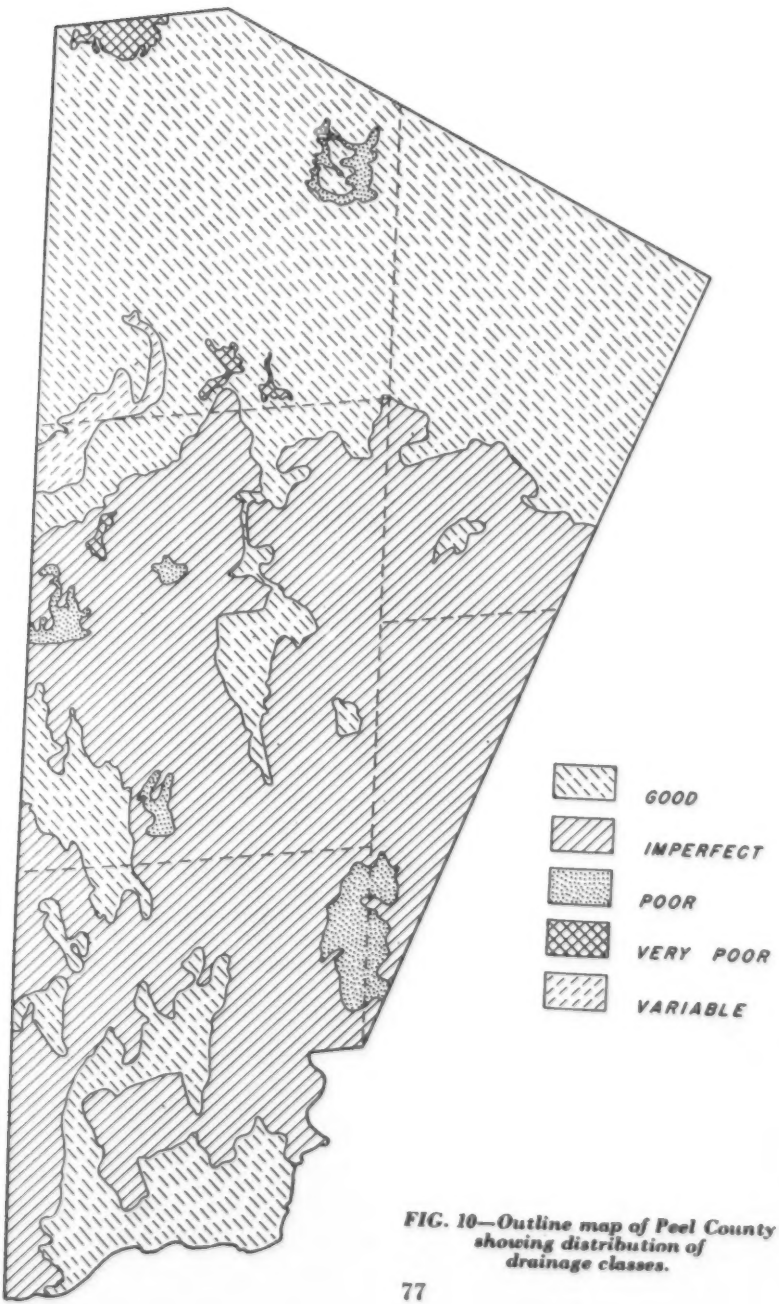


FIG. 10—Outline map of Peel County showing distribution of drainage classes.

the soil and the rate of surface runoff. Water percolation and surface runoff are dependent on topography and texture. Poor drainage results when either or both of percolation or runoff are impeded.

Drainage is the dominant problem on the poorly drained soils of the County.

Wind Erosion and Low Fertility

Problems of wind erosion and low fertility occur on the well drained sands and sandy loams. Sandy soils are low to very low in plant nutrients and organic matter and unless these elements are increased and maintained the vegetative cover is often scanty. The lack of a dense vegetative cover permits the loss of topsoil by the wind. Areas where problems of wind erosion and low fertility exist are shown in Figure 8.

Shallowness Over Bedrock

Shallowness over bedrock becomes a problem when there is less than three feet of soil over the underlying bedrock. Areas where this problem occurs are shown in Figure 8.

Muck Areas

Muck areas are often present in depressional areas where very poor drainage has aided the accumulation of organic matter. Organic soils require drainage, irrigation and additions of mineral fertilizer before they can be used extensively for crop production.

Adaptability Rating for Peel County Soils

The potentialities and limitations for crop production of the soil types have been discussed in Part III of this report. Recommendations for soil improvements have been suggested and reference has been made to those crops for which some types are especially suited. Now consideration is given to the soil type-crop relationship with particular reference to the comparative suitability of individual soil types for specific crops commonly grown in the area. A rating is given to show the adaptability of different soils to produce a wide range of crops.

Various methods have been used for making soil ratings. In this particular rating the characteristics of the soil are weighed in relation to their effect upon the production of a particular crop. Purely scientific ratings are rather difficult to obtain due to the many factors that influence crop production on the various soil types. If crop yields could be collected under specific management from sample areas well distributed over a soil type area and for a sufficient number of years to eliminate differences due to climate, crop ratings would probably be quite accurate. However, such a collection of data would be costly and time consuming.

Although yield capacity figures are not given for individual soil types the following table shows a comparative rating of the different soils in Peel County according to their capability to grow wheat, oats, barley, alfalfa, red clover, alsike, timothy, corn, peas, beans, tree fruits, turnips, and pasture. The ratings are made for crops commonly grown in the district under prevailing systems of management. The productivity of any soil varies with management and

management includes all the operations and materials required to produce a crop. The rating for Peel County soils is based on observations made during the progress of the soil survey, by data and opinions furnished by agronomic and soil workers familiar with the area and by consultation with local farmers and others. Should new varieties be introduced or farm management practices changed the ratings may of necessity have to be adjusted.

TABLE 13

CROP ADAPTABILITY RATINGS FOR GOOD CROPLAND*

Soil Type	Wheat		Oats		Barley		Alfalfa		Red Clover		Alsike		Timothy		Corn		Peas and Beans		Tree Fruits		Turnips		Pasture	
	† N.D.	‡ T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.
Harriston loam	G		G		G		G		G		G		G		G-F		G-F		G-F		G-F		G	
Woburn loam	G		G		G		G		G		G		G		G-F		G-F		G-F		G-F		G	
King clay loam	G		G		G		G		G		G		G		G-F		G-F		F		G-F		G	
Cashel clay	G		G		G		G		G		G		G		G-F		G-F		F		G-F		G	
Oneida clay loam	G		G		G-F		G-F		G		G		G		G-F		G-F		F		G-F		G	
Milliken loam	G-F	G	G	G	G-F	G	G-F	G	G	G	G	G	G	G	G-F	G	G-F	G-F	F	G-F	G-F	G-F	G	G

* The crop adaptability rating for each soil as follows:

G — Good; G-F — Good to Fair; F — Fair; F-P — Fair to Poor; P — Poor.

† N.D. — Natural Drainage. ‡ Tile Drainage.

TABLE 14

CROP ADAPTABILITY RATINGS FOR GOOD TO FAIR CROPLAND*

Soil Type	Wheat		Oats		Barley		Alfalfa		Red Clover		Alsike		Timothy		Corn		Peas and Beans		Tree Fruits		Turnips		Pasture	
	† N.D.	‡ T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.
Listowel loam	F	G-F	G-F	G	F	G	F	G-F	G-F	G	G	G	G	G	G-F	G	F	G-F	F	G-F	F	G-F	G	G
Monaghan clay loam	F	G-F	G-F	G	F	G	F	G-F	G-F	G	G	G	G	G	G-F	G	F	G-F	F-P	F	F	G-F	G	G
Peel clay	F	G-F	G-F	G	F	G	F	G-F	G-F	G	G	G	G	G	G-F	G	F	G-F	F-P	F	F	G-F	G	G
Chinguacousy clay loam	F	G-F	G-F	G	F	G-F	F	G-F	F	G-F	G-F	G	G-F	G	F	G-F	F	G-F	P	F	F	G-F	G-F	C-F
Caledon loam	F		G-F		F		F		F		F		G-F		F		F		F		F		G-F	
Malton clay	P	G-F	F	G	F	G	P	F	F	G-F	F	G	F	G	F-P	G-F	F-P	G-F	P	F-P	F-P	F	F	G
Jeddo clay loam	P	C-F	F	G-F	F	G-F	P	F	P	F	F	G	F	G	F-P	C-F	F-P	G-F	P	F-P	F-P	F	F	G

* The crop adaptability rating for each soil as follows:

Good — Good; G-F — Good to Fair; F — Fair; F-P — Fair to Poor; P — Poor.

† N.D. — Natural Drainage. ‡ T.D. — Tile Drainage.

TABLE 15

CROP ADAPTABILITY RATINGS FOR FAIR CROPLAND*

Soil Type	Wheat		Oats		Barley		Alfalfa		Red Clover		Alsike		Timothy		Corn		Peas and Beans		Tree Fruits		Turnips		Pasture	
	† N.D.	‡ T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.
Bookton sandy loam	F		F		F		F		F		G-F		F		F		F		F		F		F	
Fox sandy loam	F		F		F-P		F		F		G-F		F		F-P		F		G-F		F		F	
Dumfries loam	F		F		F-P		F		F		G-F		F		F-P		F-P		F		F		F	
Brighton sandy loam	F		F		F-P		F-P		F		F		F		F		F-P		F-P		F		F	
Parkhill loam	P	F	F-P	F	P	F-P	P	F-P	P	F	F	G-F	F	G-F	P	F	P	F	P	P	P	F	F	G-F
Lyons loam	P	F	F-P	F	P	F-P	P	F-P	P	F	F	G-F	F	G-F	P	F	P	F	P	P	P	F	F	G-F

* The crop adaptability rating for each soil as follows:

G — Good; G-F — Good to Fair; F — Fair; F-P — Fair to Poor; P — Poor.

† N.D. — Drainage. ‡ T.D. — Tile Drainage.

TABLE 16

CROP ADAPTABILITY RATINGS FOR FAIR TO POOR CROPLAND*

Soil Type	Wheat		Oats		Barley		Alfalfa		Red Clover		Alsike		Timothy		Corn		Peas and Beans		Tree Fruits		Turnips		Pasture	
	† N.D.	‡ T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.
Brockport clay loam	F-P		F		F-P		P		F-P		F		F		F-P		F-P		P		F-P		F	
Trafalgar clay loam	P	F-P	F-P	F	P	F-P	P	P	P	F-P	F-P	F	F-P	F	P	F-P	P	F-P	P	P	P	F-P	F-P	F
Cooksville clay loam	P	F-P	F-P	F	P	F-P	P	P	P	F-P	F-P	F	F-P	F	P	F-P	P	F-P	P	P	P	F-P	F-P	F
Dumfries sandy loam	F-P		F-P		P		F		F		F		F		P		P		F-P		P		F	
Pontypool sandy loam	F-P		F-P		P		F		F		F		F		P		P		F-P		P		F	
Fox sand	P		F-P		P		P		F-P		F		F		P		P		F		P		F-P	
Berrien sandy loam	P	F-P	F-P	F-P	P	P	P	F-P	P	F-P	F-P	F	P	F	P	F-P	P	F-P	P	F-P	P	F-P	F-P	F
Brady sandy loam	P	P	F-P	F-P	P	P	P	P	P	F-P	F-P	F-P	P	F-P	P	F	P	F	P	F	P	F-P	F-P	F-P

* The crop adaptability rating for each soil as follows:

G — Good; G-F — Good to Fair; F — Fair; F-P — Fair to Poor; P — Poor.

† N.D. — Natural Drainage. ‡ T.D. — Tile Drainage.

TABLE 17

CROP ADAPTABILITY RATINGS FOR POOR CROPLAND*

Soil Type	Wheat		Oats		Barley		Alfalfa		Red Clover		Alsike		Timothy		Corn		Peas and Beans		Tree Fruits		Turnips		Pasture	
	† N.D.	‡ T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.
Gilford loam	P	F-P	P	F-P	P	F-P	P	P	P	F-P	P	F	P	F-P	P	P	P	F-P	P	P	P	F-P	F-P	F-P
Lily loam	P	F-P	P	F-P	P	P	P	F-P	P	F-P	P	F	P	F-P	P	P	P	F-P	P	P	P	F-P	F-P	F-P

* The crop adaptability rating for each soil as follows:

G — Good; G-F — Good to Fair; F — Fair; F-P — Fair to Poor; P — Poor.

† N.D. — Natural Drainage. ‡ T.D. — Tile Drainage.

TABLE 18

CROP ADAPTABILITY RATINGS FOR SUBMARGINAL CROPLAND*

Soil Type	Wheat		Oats		Barley		Alfalfa		Red Clover		Alsike		Timothy		Corn		Peas and Beans		Tree Fruits		Turnips		Pasture	
	† N.D.	‡ T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.	N.D.	T.D.
Lockport clay	P		P		P		P		F-P		F-P		F-P		P		P		P		P		F-P	
Missisauga clay loam	P	P	P	P	P	P	P	P	P	P	F-P	F-P	F-P	F	P	P	P	P	P	P	P	P	P	F-P
Farmington loam	P		P		P		P		P		F-P		F-P		P		P		P		P		P	
Bottom Land																							G-F	

* The crop adaptability rating for each soil as follows:

G — Good; G-F — Good to Fair; F — Fair; F-P — Fair to Poor; P — Poor.

† N.D. — Natural Drainage. ‡ T.D. — Tile Drainage.

PART V

ANALYTICAL DATA

Chemical and physical analyses of surface soils are presented in Table 19. The chemical analyses of surface soils have some value as indications of the comparative levels of available plant nutrients. The physical analyses indicate the relative amounts of sand, silt and clay in the samples analyzed.

Sampling

The samples for analysis were taken after the County was surveyed and mapped. The number of samples of surface soil from each soil type taken was determined largely by the extent and importance of the particular type. In order to eliminate as far as possible variations due to cultural and management practices the samples of surface soil were taken from old pastures where fertilizer applications had not been made recently.

Analytical Methods

Mechanical Analysis	Bouyoucos Hydrometer method. Ref: Soil Science, Vol. 42, 1936, p 225.
	NOTE: Organic matter not destroyed prior to dispersion.
Reaction	Glass electrode.
Readily Soluble Phosphorus	Lohse, Ruhnke method. Ref: Soil Science 35:6, 1933.
Base Exchange Capacity and Available Potassium, Calcium, Magnesium	Schollenberger, Simon method. Ref: Soil Science 51:1, 1945.
	NOTE: The alternate method was used in which the soil is leached with 1 N KCl.
Organic Matter	Allison method. Ref: Soil Science. October, 1935.

TABLE 19

PHYSICAL COMPOSITION, REACTION, BASE EXCHANGE CAPACITY AND PER CENT SATURATION OF SURFACE SAMPLES FROM PEEL COUNTY, ONTARIO

Soil Series	Sample No.	Location			Sand	Silt	Clay	Reaction pH (Glass Electrode)	Phosphorus Readily Soluble Lbs. P/Acre	Base Exchange Capacity Me/100gms.	Exchangeable Calcium Me/100g.	Exchangeable Magnesium Me/100g.	Exchangeable Potassium Me/100g.	Organic Matter %C x1.724
					Boutoucos Hydrometer									
		Township	Con.	Lot	Per Cent 1.0-.05mm	Per Cent .05-.002mm	Per Cent .002mm							
Brighton	11H	Albion	I	20	68.4	25.8	5.4	7.0	48	8.36	6.6	5.0	.084	2.4
	16H	Albion	VIII	27	85.8	10.2	4.0	6.4	90	7.30	13.6	5.4	.051	2.4
Brockport	9W	Toronto	II	23	27.8	47.0	25.2	5.1	20	21.62	6.9	2.9	.293	4.6
Caledon	1H	Caledon	VI W	9	34.0	54.4	11.6	7.0	58	17.56	17.5	4.8	.132	5.1
	2H	Caledon	VI W	14	43.2	47.2	9.6	6.4	76	12.72	11.2	2.9	.121	3.7
	3H	Caledon	IV W	14	38.4	49.0	12.6	6.4	48	13.16	12.3	11.6	.135	3.9
	4H	Caledon	II W	30	50.6	41.4	8.0	7.0	100	11.10	10.9	3.5	.141	3.1
	30W	Caledon	III W	13	47.2	43.4	9.4	5.9	50	9.32	6.4	3.4	.048	2.7
	24W	Albion	I	20	75.5	20.2	4.3	6.0	54	8.16	4.7	3.9	.075	2.5
Chinguacousy	1W	Chinguacousy	I W	11	30.8	44.6	24.6	6.9	65	23.34	17.0	5.6	.260	5.9
	2W	Chinguacousy	III W	18	35.2	42.0	22.8	6.5	54	19.73	12.5	6.0	.222	4.6
	3W	Chinguacousy	VI	15E	35.8	42.0	22.2	5.1	20	15.80	6.2	3.8	.185	4.0
	4W	Chinguacousy	III	25	34.2	41.0	24.8	5.6	44	16.28	9.5	4.1	.232	4.1
	5W	Chinguacousy	I W	26	39.8	40.6	19.6	5.6	28	14.56	7.3	4.0	.187	4.0
	6W	Chinguacousy	I W	18	34.2	46.2	19.6	5.6	16	16.10	9.1	4.2	.166	5.4
	7W	Toronto	III	6	30.4	45.4	24.2	5.8	44	17.91	10.9	4.8	.262	4.2
	8W	Toronto	III	2	31.2	41.0	27.8	6.0	47	18.02	10.9	6.2	.387	4.5
	11W	Toronto	II	11	48.2	34.8	17.0	6.2	30	14.39	9.5	4.6	.183	4.2
	12W	Toronto	I E	6	41.6	39.8	18.6	6.4	30	13.46	9.6	4.4	.283	3.3
	13W	Toronto	III E	2	38.6	45.0	16.4	5.6	24	15.25	9.6	4.0	.193	6.0
	14W	Toronto	III S	32	21.2	36.6	42.2	5.2	84	18.17	9.2	5.1	.381	4.7
	17W	Chinguacousy	II E	20	46.8	36.6	16.6	6.0	44	13.90	10.9	4.7	.244	4.4
	18W	Chinguacousy	II E	28	38.2	37.0	24.8	6.0	38	12.68	8.2	3.2	.098	3.0
	22W	Caledon	I E	1	43.4	37.8	18.8	6.9	26	15.22	13.0	7.5	.084	4.5
	27W	Chinguacousy	III W	9	32.4	43.6	24.0	5.7	66	16.77	10.1	5.0	.274	4.2
Cooksville	10W	Toronto	I	21	28.8	49.6	21.6	5.3	20	18.24	9.3	4.1	.175	6.6

Dumfries	31W	Caledon	V W	7	39.4	48.2	12.4	6.8	62	11.08	11.1	5.8	.218	3.8
	7H	Caledon	III E	16	55.4	35.6	9.0	7.4	110	10.56	18.4	7.3	.090	3.5
	8H	Caledon	III E	19	56.0	35.6	8.4	7.0	130	9.56	13.0	7.4	.227	2.6
Harriston	20W	Caledon	VI W	20	46.6	41.2	12.2	7.5	61	10.95	12.0	5.4	.061	3.5
	21W	Caledon	I E	1	41.8	47.0	11.2	6.8	54	14.32	11.6	6.2	.060	4.2
	5H	Caledon	I E	21	40.0	50.4	9.6	7.6	90	13.10	16.6	4.9	.128	4.3
	6H	Caledon	I E	19	39.0	50.0	11.0	7.4	84	15.50	16.0	7.2	.227	4.4
	9H	Caledon	IV E	19	39.0	48.2	12.8	7.0	70	13.86	12.5	8.1	.161	4.4
	10H	Caledon	V E	20	47.4	41.2	11.4	7.0	46	11.84	9.5	6.9	.161	3.9
King	26W	Albion	VIII	13	28.0	43.2	28.8	6.0	70	18.52	12.9	4.8	.294	4.2
	14H	Albion	VIII	13	38.6	41.4	20.0	6.7	200	16.72	23.5	6.2	.492	3.9
	15H	Albion	IX	18	25.8	48.6	25.6	7.1	178	14.08	32.7	6.9	.153	2.8
	18H	Albion	V	15	33.6	40.8	33.6	6.1	144	13.56	6.7	4.4	.060	3.5
Malton	15W	Toronto	VI	6	26.4	42.4	31.2	6.1	134	23.92	19.4	5.3	.355	5.3
Oneida	19W	Chinguacousy	III	6	34.4	45.0	20.6	5.9	36	16.68	10.8	4.4	.274	4.6
	25W	Albion	IV	12	32.6	44.0	23.4	6.8	67	12.32	18.0	7.1	.198	3.8
	28W	Chinguacousy	II E	11	39.8	42.0	18.2	5.9	25	18.04	9.7	5.2	.215	6.3
Peel	32W	Toronto Gore	VIII	11	24.2	40.0	35.8	6.6	98	23.57	27.7	8.9	.408	6.3
	16W	Toronto	III	15	25.8	42.4	31.8	6.4	86	21.76	21.0	6.0	.292	4.9
Pontypool	23W	Chinguacousy	IV E	34	59.8	28.4	11.8	5.9	38	8.11	5.5	4.5	.110	2.3
	24W	Caledon	II E	4	63.2	28.4	8.4	6.9	40	7.89	8.8	4.6	.139	2.8
	12H	Albion	IV	28	59.2	33.6	7.2	6.4	54	8.64	7.5	4.7	.092	2.7
	13H	Albion	VI	34	71.2	21.6	7.2	7.6	100	6.66	22.7	4.6	.072	1.5
	17H	Albion	IV	19	54.6	32.0	13.4	6.1	72	9.04	8.5	5.2	.307	3.2